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ABSTRACT

This document presents student readings that address a variety of environmental issues. The individual articles present a global perspective that is both alarming and hopeful. Drawing from events and situations in both the northern and southern hemispheres, the articles describe a world in crisis. By critically examining the status quo, the articles attempt to get to the roots of the crisis, then move on to describe avenues for change and reasons for hope. Readings appear under the chapter headings "Environmental Ideas and Problems"; "Atmosphere"; "Energy"; "Water Pollution"; "Waste Disposal"; "Mega-Development"; "Forests"; "Biodiversity"; "War and the Environment"; "Earth Summit"; and "Solutions." The document concludes with a set of suggested activities and ideas for teachers. Teachers can use the readings individually or as a unit. (SG)

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the ENVIRONMENT SCRAPBOOK

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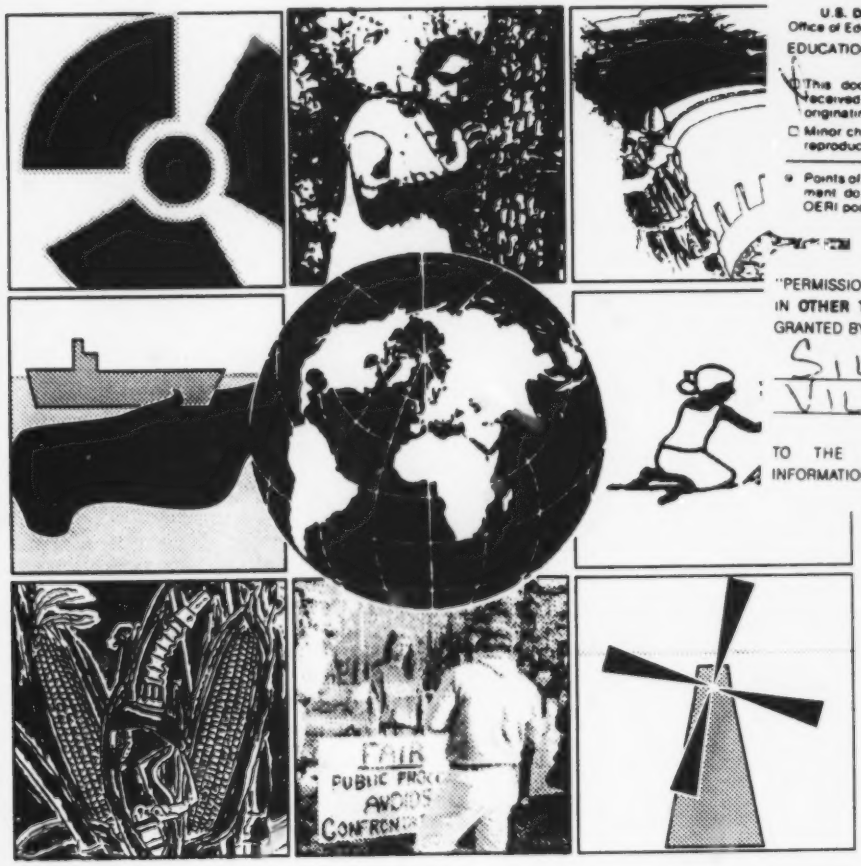

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the ENVIRONMENT SCRAPBOOK

A Collection of Articles on Environmental Issues for use in Secondary Schools
Global Reading Issues Kit #1 of a five kit set.
Revised 1992 — with Activities and Ideas to accompany the articles

Edited by Andrew Gage and Sandy Ockenden
Activities and Ideas by Karen Barnett and Kerry Robertson
Layout by Andrew Gage

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Marvin Dodds, Susan Gage and John Simonton
for review and comments

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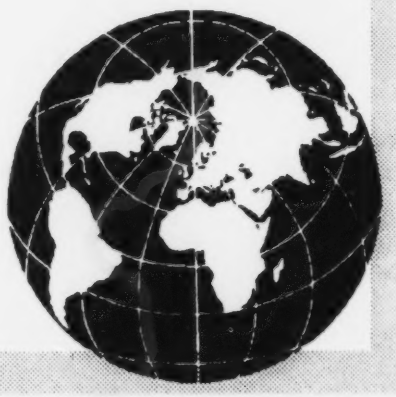

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ABOUT THIS SCRAPBOOK

The articles in this scrapbook present a global perspective that is both alarming and hopeful. Drawing from Southern and Northern experiences the articles describe a world in crisis. But they don't stop there. By critically examining the status quo, the articles attempt to get to the roots of the crisis, and then move on to describing avenues for change and stories of hope and success. Many of the essential elements of positive development are highlighted throughout: sustainable economics and resource management; community empowerment; respect for human rights and dignity; and the recognition of the role and status of women.

The readings are followed by a section of teaching ideas and activities. These are designed to guide the users through further examination of the ideas presented in the articles.

Individual sections of this scrapbook can be used on their own, or in conjunction with others. Users are encouraged to read with an open mind, a willingness to learn, and a desire for change that is both environmentally sustainable *and* socially just.

ABOUT GLOBAL ISSUES READING KITS

This scrapbook is one in a series of Global Issues Reading Kits. The complete series is:

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Minneapolis, MN 55403
USA

* Note: David G. Dodge, Editor of Borealis, has kindly offered to give a free copy of the magazine to any teacher who writes to him on school letterhead.

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THE STATE OF THE WORLD ENVIRONMENT 1991

The following article is a summary of *The State of the World Environment, 1991: report of the Executive Director of the United Nations Environment Programme.*

Economic conditions

The global economy continues to be one of the major driving forces behind environmental degradation. Whether it is the sprawl of deserts or the loss of tropical rainforest as the world's poor cut trees for firewood and clear land for agriculture, or the ineluctable warming of the planet as vehicles and factories deposit millions of tonnes of greenhouse gases into the atmosphere, economic pressures lie behind them all. And it is the poor who suffer most because they have fewer resources available to them in their struggle to survive. The disparity is perhaps nowhere more glaring than in comparative life expectancies, 73 years in developed nations compared to 60 years in developing nations.

Economic growth in the 1980s was erratic and varied widely among countries and continents. In general, it was much slower than in the 1970s. In many developing countries, the 1980s saw external debt escalating, prices for raw commodities falling, adjustment policies not functioning as expected, and one third of the population of the developing world — some 1.2 billion people — living under the poverty line of US$370 per person per year. For these poor, government economic reforms have done virtually nothing or, on the contrary, intensified their plight.

Many governments in developing countries have remained preoccupied with short-term economic and political crises and have ranked environmental and natural resource management extremely low on their priority lists.

Marine environment

Oceans cover more than 70 percent of the Earth's surface and contain some of the Earth's most complex and diverse ecosystems. Although the coastal zone constitutes only about 10 percent of the total oceanic area, it accounts for more than half of the oceans' biological productivity and nearly all the world's catch of fish. In addition, coastal areas contain many kinds of ecosystems that are vital to marine life and humankind. In fact, about 60 percent of the world's population, or nearly 3 billion people, live on or within some 100 kilometres of a sea coast, and more than half the population of developing countries obtain 40 percent or more of their total animal protein intake from fish.

While the impact of human activities on the open ocean has been relatively slight, coastal zones continue to receive discharges from rivers laden with sediment from hinterland erosion, and domestic and industrial effluent. Sediment smothers bottom-dwelling plant and animal life and takes an especially heavy toll on coral reefs. Ships also contribute to considerable coastal pollution, especially through oil from accidental spills or the deliberate clearing of contaminated ballast water.

Equally important are the physical changes in coastal habitats — especially salt marshes, sea-grass beds, coral reefs and mangrove forests — wrought by increasing population pressures and often ill-planned urban, agricultural and industrial expansion.

Food production

Global agricultural output stagnated from 1987 to 1989, remaining at approximately 1986 levels. While Asia increased its per capita food production by about 1.7 percent and Latin America by 0.7 percent a year over the past decade, Africa suffered a drop in per capita food production of about 0.6 percent a year over the same period.

If world food production is to increase by 60 percent by 2025 — as it must to maintain current nutritional levels for a projected population of 8.5 billion — croplands must expand or yields increase. Unfortunately, most areas of potential expansion for agriculture either lack water or have physical or chemical constraints such as steep slopes, easily eroded, poorly drained or alkaline soils, or other conditions toxic to plants. Moreover, clearing land for agriculture has accelerated the rate of habitat loss and species extinction. Increasing crop yield is likely to require more inputs of fertilizer, pesticides, and irrigation, with the risk of worsening water and soil pollution.

Serious soil erosion is occurring in most of the world's important agricultural regions and is increasing as more marginal land is farmed. In developing countries especially, it is seriously damaging agricultural productivity, shortening the life of dams and irrigation projects, filling in canals and harbours, and harming productive wetlands. In many regions, rates of soil loss exceed rates of soil formation at least tenfold, and it has been estimated that about 25 billion tonnes of topsoil are lost from the world's croplands each year. Soil losses due to cultivation of steep marginal

lands, reduced forest and vegetative cover, and improper irrigation are expected to accelerate, especially in north and central Africa, the humid and high altitude areas of Latin America, and much of south Asia.

It is still too early to predict the full impact of new biotechnologies on the world's agricultural production and trade, and on environment. Unlike the Green Revolution technologies, which were developed largely by national and international public sector institutions, biotechnology research and marketing are being undertaken mainly by the private sector. This means that the spread of biotechnologies may not be as free or as rapid as the transfer of Green Revolution technologies, seriously disadvantaging most developing countries in both production and international trade.

Biological diversity

Estimates of the number of living species on Earth vary from 5 million to 30 million, of which only 1.4 million have been identified and classified, with the highest concentration of species diversity in tropical regions. Wild species and the genetic variations within them are used substantially in the development of agriculture, medicine and industry. In addition, the non-economic benefits of a wide diversity of species make the full worth of protecting habitats and species difficult to quantify.

Graphic: Our Planet, Vol 4, N2, 1992

Though there is no precise estimate of the number of species that have been lost in major habitats, experts believe that 25 per cent of the Earth's total biological diversity is at risk of extinction during the next 20 to 30 years, with serious world-wide implications for agriculture, medicine and industry.

Loss of biological diversity is caused by habitat loss or degradation from pollution, over-exploitation of soils, forests, coastal areas and agricultural land, and the introduction of exotic species that prey on, compete with or alter the natural habitat of native species.

As air and water are polluted, forests cleared, wetlands drained, valleys flooded and roads built habitats are transformed and effectively lost for certain species. Between 1990 and 2020, species extinction caused primarily by deforestation may eliminate between 5 and 15 per cent of the world's species — a potential loss of 15,000-50,000 species a year or about 40-140 a day.

Recognizing the growing severity of threats to biological diversity and the increasingly international nature of the actions required to address the threats, a global strategy for dealing with all aspects of biological diversity is being prepared by the World Resources Institute, IUCN and UNEP in collaboration with several other institutions. Furthermore, IUCN, FAO and UNEP have embarked on the preparation of an International Convention on the Conservation of Biological Diversity.

Atmosphere

Air pollution continues to be a major environmental problem in most countries. Of particular concern, especially in urban areas, are pollulants that stem predominantly from cars. Although levels of sulphur dioxide, suspended particulate matter, nitrogen oxides and carbon monoxide emissions declined or at least stabilized in many urban areas as a result of environmental control measures, about half of the people living in urban areas worldwide — some 990 million — are still exposed to unhealthy levels of sulphur dioxide, and more than one billion people are exposed to excessive levels of particulates. In some areas, tropospheric ozone, the principal ingredient in urban smog, is of particular concern. Recently, hydrogen peroxide — another oxidant that may significantly degrade air quality — has been identified in urban air environments.

Acidic deposition or precipitation (in the form of acid rain, snow and fog) continues to be a major international environmental issue. It threatens fresh-water fisheries, agriculture and wildlife, and has been implicated in the extensive die-back of forests in Europe. A recent assessment of forest damage in Europe indicates that, of a total forest area of 141 million hectares, some 50 million hectares (or 35 percent) have damaged to varying degrees by acidic precipitation.

The Protocol to the Convention on Long-range Transboundary Air Pollution, which came into force in 1987, requires participating nations to reduce either national sulphur emissions or their transboundary flows by 30 per cent of 1980 levels by 1993. The Nitrogen Oxides Protocol, signed in November 1988, calls for a freeze on emissions of nitrogen oxides at the 1987 levels in 1994, as well as further discussions beginning in 1996, aimed at actual reductions. A November 1988 directive by the EEC would lower community-wide emissions of sulphur dioxide from existing power plants by a total of 57 percent of 1980 levels by 2003, and emissions of nitrogen oxides by 30 percent by 1998. These measures represent milestones in efforts to transboundary reduce airborne emissions.

"Sound like the world has some problems to work out."

Graphic: The Africa File, VIDEA

Progress has been made to protect the stratospheric ozone layer from further depletion. The 1987 Montreal Protocol on substances that deplete the ozone Layer — which came into force on first January 1989 — has been strengthened in the light of recent extensive studies carried out by four international panels under the auspices of UNEP. The Parties to the Montreal Protocol agreed at a meeting convened in June 1990 in London that controlled chlorofluorocarbons (CFCs) should be phased out by 2000, with intermediate cuts of 50 percent by 1995, and 85 percent by 1997. Halons and carbon tetrachloride are also to be phased out by 2000. Methyl chloroform will be frozen at 1989 levels by 1993, and phased out by 2005.

Graphic: Our Planet, Vol 4, N2, 1992

The 1990 London meeting agreed also to establish an international fund to help developing countries meet the costs of complying with the revised Montreal Protocol and to provide the necessary transfer of technology. The fund is based in Montreal.

The Intergovernmental Panel on Climate Change (IPCC), created under the auspices of UNEP and WMO, carried out extensive studies on greenhouse gases and the possibility of climate change, the impacts of such changes and the formulation of response strategies. The IPCC studies were presented at the Second World Climate Conference convened in 1990. The international community is preparing to start negotiating an international agreement to deal with climate change, particularly through control of greenhouse-gas emissions other than chlorofluorocarbons, which have already been regulated under the Montreal Protocol.

Deforestation

Recent studies from a number of countries have shown that the rate of deforestation is higher than previously estimated. Based on these studies, it has been estimated that global tropical deforestation is most likely to be in the range of 14-20 million hectares per year. Though tropical forests cover only seven percent of the earth's land surface, they contain more than half of all living species. Deforestation is a major contributor to soil erosion and loss of biological diversity.

Population

The world's population reached 5.3 billion in 1990 and is expected to reach 6.3 billion by 2000. About 93 percent of the extra one billion people will be in developing countries.

Increasing human numbers place intense pressure on ecosystems and natural resources, and this pressure is expected to increase until world population stabilizes at about 10 billion between the years 2050 and 2070. However, this stabilization will be achieved only if present efforts to check population growth are pursued vigorously.

Water and Sanitation

The goals set by the International Drinking Water Supply and Sanitation Decade (1981-1990) — to provide all people with clean water and adequate sanitation facilities by 1990 — were not achieved in spite of the fact that IDWSSD has provided about 1.4 billion people in developing countries with safe, clean water and about 1.5 billion people with sanitation services. Some 1.2 billion people — or 31 percent of the population in developing countries — are still without access to safe, clean water, and 1.8 billion — 43 per cent of the population — are without access to appropriate sanitation facilities.

The slow progress towards achieving the IDWSSD goals has been attributed to population growth, the unfavourable world economic situation and the debt burden of developing countries, which has been a major obstacle to investment in infrastructure projects. The aims of the UN in providing clean water were also hampered by the difficulty of providing appropriate technologies, like simple, reliable pumps, to developing country users.

The bulk of polluting matter discharged into water courses worldwide is organic material in the form of domestic sewage and effluents from agriculture-related industries. Faecal contamination is a common problem throughout all continents and a contributor to the high disease and death rates of infants in large parts of Asia, Africa, Central and South America. Industrial processing of raw materials and the use of chemicals in manufacturing usually involve discharges into water bodies of potentially toxic wastes such as heavy metals and synthetic organic chemicals, including organochlorine pesticides and polychlorinated biphenyls (PCBs). Regulatory actions have contributed to a marked drop in concentrations of lead, cadmium, chromium and copper in most OECD member-countries' rivers since 1975. Environmental degradation and population growth, with consequent increase in demand for water, have contributed to a shortage of good quality fresh water. By the year 2000, many countries will have about half as much water per capita as they had in 1975 and yet will experience much greater demand for water for agricultural, industrial and domestic use. Fresh water is very unevenly distributed around the world and, in many regions, subject to seasonal and yearly fluctuations. At present, world-wide water withdrawal for irrigation accounts for about 66 percent of water use, 24 percent goes to industry and the other 8 percent is used in homes, for livestock rearing and for recreational and other purposes.

For copies of *The State of the World Environment, 1991*, write to: Information and Public Affairs Branch, UNEP, P.O. Box 30552, Nairobi, Kenya.

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THE ROAD TO THE

August 6, 1945. Hiroshima. First atom bomb explodes.

1952. Mexico. Caribbean Monk Seal last seen, now extinct.

March 1954. Bikini Atoll. First "H" bomb explodes.

1956. Japan. First person dies because of mercury released into Minimata Bay. Thousands are poisoned.

1978. USA. Lois Gibb blows whistle on toxic waste dump, and creates the Citizen's Clearing-house for Hazardous Wastes

1978. USA. Love Canal. Toxic waste dump discovered underneath housing project.

1977. Kenya. Green Belt Movement of women organized to plant trees.

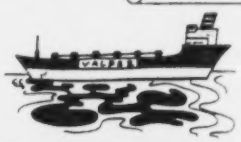
March 1979. Three Mile Island, USA. Nuclear accident at power plant.

December, 1984. Bhopal, India. Gas explosion at Union Carbide factory, thousands die.

1984-89. Bhopal, India. Women protest against Union Carbide for compensation for victims.

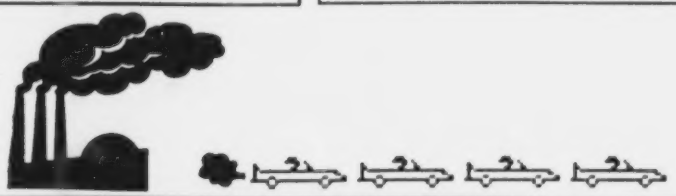
1985. Nairobi, Kenya. End of Decade for Women. FLS affirms the importance of energy and environment considerations for women.

Desertification: six million hectares of land are permanently lost every year because of desertification, and three or more times that area of land becomes difficult for farming. *The Environment: a Threat to Children.* Aurat, Vol. 4, 1+2 1990.



March 24, 1989. Alaska, USA. Exxon Valdez hits a reef, causing the worst oil spill in US history.

Deforestation: The world's rainforests are being destroyed at a rate of an acre and a half per second. World Resources Institute and UNDP, 1990. Five plant species become extinct every day. World YWCA Energy & Environment, 1990.



Environmental Pollution. Major causes: dense population, cars and industry. In Mexico City for example, there are 2,800,000 cars for a population of 20 million people and a high concentration of industry. 100,000 children a year die because of pollution. Life expectancy has been reduced by five years. Women's Health Journal. Oct.-Nov.-Dec. 1990 #20.
In Kuwait, hundreds of oil wells are set on fire during war (January 1991).

EARTH SUMMIT, 1992

1957. Space. Sputnik, first spacecraft, is launched by Soviet Union.

1960** World population reaches more than 3 billion.

1962. *Silent Spring*, by Rachel Carson, revolutionary book on danger of pesticides.

Mid 1960's. Mururoa. French Nuclear Tests in Pacific.

1968. Pacific Nuclear-Free Movement begins, with women and students in Fiji playing leading role.

1967-1975. Vietnam. Agent Orange: massive use of dioxin-containing herbicides by US Forces during Vietnam War.

1972. Stockholm Conference.
1. Development plans to be compatible with sound ecology.
2. No more nuclear testing.

1974. India. Chipko Movement. Women protect trees from loggers.

July, 1985. New Zealand. Greenpeace ship ***Rainbow Warrior,*** while protesting nuclear testing in the Pacific, is sunk by French agents.

April 26, 1986. USSR. Chernobyl: nuclear accident at power plant.

1986. New Zealand. Government bans nuclear warships. **Girlcott** (opposite of boycott) by women worldwide **in support of** New Zealand products.

1989. Ozone above the Antarctic decreased by half. El Mercurio, 16 April 1989, Chile, quoted in Women's Health Journal, #17, Isis International

December 22, 1988. Brazil. Francisco (Chico) Mendez, rubber tapper/activist working to save rainforest, killed in the Amazon.

1987. Brundtland Report. Sustainable development strategies to the year 2000 and beyond.

1987** World population reaches 5 billion.

Global Warming: Loss of forests, burning of coal, oil and natural gas causes increase of carbon dioxide in the atmosphere, causing the earth to heat up. *50 Simple Things You Can Do to Save the Earth*, The Earth Works Group.

Pesticides: Dangerous levels of DDT residue are appearing in the Third World. Residues in India are the highest in the world. Pesticides Action Network, June 89

** *Population Issues*, UNFPA 1991

Diet for a small Planet:
Less is more

OTTAWA - Twenty years ago, before it was fashionable or even respectable to be an environmentalist, the Club of Rome asked three leading social scientists at the Massachusetts Institute of Technology to find out what would happen if the human race kept consuming, polluting and reproducing at present rates.

Their answer shocked the world.

Sometime within the next 100 years, they warned, the planet would reach its physical limits. Growth would have to stop or a global catastrophe would result.

Anxious citizens snapped up copies of their book *The Limits to Growth*. It sold 9 million copies in 29 languages.

SO BEGAN the modern environmental movement.

Last year, in anticipation of this week's Earth Summit in Rio de Janeiro, the authors, now scattered at three different universities, decided to update their landmark work. They re-ran their computer program, feeding in everything that has happened in the last 20 years.

They got an unpleasant surprise. The world had already surpassed its growth limits in many areas, fish stocks were dwindling, certain species had become extinct, trees were being harvested faster than new ones could grow, smokestacks were churning out more pollutants than the atmosphere could handle. The day of reckoning was approaching faster than they had foreseen.

They called their sequel *Beyond the Limits*.

For anyone who is having trouble ploughing through all the rhetoric, the statistics, the claims and counterclaims surrounding the Rio summit, this book is a good place to start.

IT IS SOBERING but not oppressive. Nowhere does it say that mankind is sliding inexorably toward oblivion. What it does say is the present way of doing things is unsustainable. "The future, to be viable at all, must be one of drawing back, easing down, healing," the book argues. "Poverty cannot be ended by indefinite material growth. It will have to be addressed while the material human economy contracts.

"Like everyone else, we didn't really want to come to the these conclusions," the authors admit. "But the more we compiled the numbers, the more they gave that message loud and clear."

Their computer model told them that:

•At current rates of population growth and agricultural production, the world will no longer be able to feed itself by the year 2050.

•At current rates of water consumption, the earth's supply will be adequate for just 20 to 30 years.

• At current rates of logging, the world's tropical forests will be gone within 47 years.

The computer could not be as precise about soil contamination, fuel shortages, global warming or ozone depletion, but in all these areas it showed that humanity was on a destructive path.

PEOPLE MAY NOT realize they are taking more than the planet can give, the authors grant. The first danger signals — isolated shortages, gradual climatic changes, inexplicable health problems — are not always clear. They are not always taken seriously.

And even when people realize they are destroying their habitat, it is hard to give up the dream of perpetual growth.

The quest to build more, acquire more, and consume more has motivated the human race for the last 200 years. It has produced a rising standard of living and an increasing lifespan. It has provided individuals with a sense of security and self-worth.

"Most people see growth as something to celebrate," the authors acknowledge. "Most societies, rich or poor, seek some kind of expansion as a remedy for their most immediate and important problems."

This philosophy made sense when the earth was lightly populated, with abundant resources. Unfortunately, it no longer does.

BUT THIS IS NOT the disaster that it might seen, the authors argue, Human beings might actually be happier and more fulfilled if they adopted a new set of values.

"We see easing down from unsustainability not as a sacrifice, but as an opportunity to stop battering against the earth's limits and to start transcending self-imposed and unnecessary limits in human institutions, mindsets, beliefs and ethics.

Behind these soothing words, however, lies a wrenching adjustment.

CAROL GOAR

People would have to learn the meaning of the word "enough." They would have to stop trying to meet non-material needs for acceptance, achievement, and self-respect with material things. They would have to solve world poverty by redistributing resources, not exploiting them. They would have to move beyond technological solutions to the environmental crisis: recycling, pollution control, more efficient land use, to human solutions, taking less, sharing more, accepting limits.

This is not the kind of message that is likely to come out of the Rio summit. Politicians aren't very good at promising less.

Beyond the Limits is an important book. It dares to say what people intuitively know, but don't want to hear.

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THE ILLUSION OF PROGRESS

by Bert Weichel

The phrase "sustainable development" made me uncomfortable the first time I heard it. It was particularly unsettling to witness the zeal with which certain guardians of the status quo embraced the idea.

In fact, the concept as presented is an oxymoron. Still, it is such a common catchphrase that we need a common understanding of the inverted term. The next 10 years must be the turn-around decade if we are to have any hand in altering the winds of ecological change we have set in motion. Look closely at global conditions, and you can see we don't have time to let decision-makers, misconceptions in hand, promise a future our descendants can't live with.

For too many people development equates with economic growth, and with progress. They conclude that a little more attention given to environmental impact will allow us to sustain economic growth. They want us to have our cake and eat it too.

Our economic equations are fundamentally flawed, borne out of ignorance of ecology, and our place within the biosphere. Limitations of supply; the true costs of depletion and degradation of our resource base are ignored. As well, there is ignorance of the true costs of exuding waste into our own life support system.

This is how we have been able to create what World Watch Institute's Lester Brown has called the illusion of progress," a misconception that prosperity is attained through perpetual growth in total economic output.

Tragically, no distinction is made between activities which maintain or improve, and those which degrade and undermine, the ecosystems on which our life depends. In fact, those countries whose rates of economic growth, resource consumption and waste production are highest, are considered most prosperous.

Where growth slows or is absent, words such as "recession" and "underdevelopment" are used. Enormous effort is expended to maintain growth, in the belief this will cause economic stability. The gaze of politicians, economists and industrialists remains fixed on artificial and dysfunctional indicators like the gross national product. The connection between the economy and eroding soils, thinning ozone, acid rain, poisoned rivers, desertification, uncontrolled waste, extinction, and shrinking forests remains unseen.

Then along comes this vague, yet widely-uttered term "sustainable development." While many see it as heralding a new age, to the extent that it perpetuates the illusion of progress, it is a concept to be shunned.

The common goal should instead be to develop sustainability. The inversion of the term yields a fundamental change in meaning. If we develop sustainability in our economic and social systems, we undertake a transformation in which there is really no place for heedless and unending growth in economic output, if it is based on flawed equations.

Once the term is clarified, it is clearer too what the common goal should be. The transformation to sustainability, suggests Mike Nickerson, author of *Bakavi: Change the World, I Want to Stay On*, means we must redesign society.

What has to be changed is our entire way of living, and the attitudes and perceptions from which it sprang. What is at stake is the ability of our species, along with millions of others, to live on earth.

Struggling to define an inverted catchphrase like "sustainable development" is effort spent trying to clarify the meaning of a misconception. Instead, let's get on with the crucial task of working out how to make history's most profound transformation — to develop, if we can, a sustainable human society in a healthy world.

Bert Weichel is a Saskatoon-based consulting ecologist and university lecturer in geography. He is past president, Saskatchewan Environmental Society, and a member of the Saskatchewan Round Table on Environment and Economy.

Reprinted from Briarpatch, February, 1991

Science and Sustainable Development

The law of conservation of matter states:
In any ordinary physical or chemical change, matter is neither created nor destroyed but transformed from only one form to another.
Or: We can never really throw anything away. Everything we thought we discarded, burned, or buried is still with us in one form or another. We will always be faced with pollution in one form or another and so must make controversial political, economic, and ethical decisions regarding the type and amount of pollution we are willing to live with. What sacrifices are you willing to make to reduce pollution?

The first law of thermodynamics states:
In any ordinary physical or chemical change, energy is neither created nor destroyed but merely changed from one form to another.
Or: There is no free lunch; it takes energy to get energy.

The second law of thermodynamics states:
In all conversions of heat energy to work, some of the energy is always degraded to a more dispersed and less useful form, usually given off as heat to the environment.
Or: Not only can we not get something for nothing (the first law), we can't even break even in terms of energy quality. We can recycle matter, but we can never recycle high-quality energy. Much of modern civilization is built around the internal combustion engine and incandescent light that, respectively, waste 90 and 95 percent of their initial energy input.

VIDEA © 1989

Can Science Save Us?

Fred Pearce describes the frenzied scientific search to find a magic cure for global warming.

'How to solve the carbon dioxide problem without tears' was the name of a paper at a 1988 Moscow conference. The idea was to use nuclear power to turn Siberian natural gas into hydrogen — which would then partly replace fossil fuels like coal and oil. The result: cleaner energy, no carbon dioxide (CO_2) and no greenhouse effect.

It seems every scientist is chasing a 'technical fix' to shut down global warming. Last summer a Swiss physicist published details of how a giant aluminium mirror put into space could reflect some of the sun's heat away from the earth's surface, so keeping us cool. It would have to be a big mirror, of course. One about 20 times the size of Britain would keep us going for a few decades. It would cost about as much as the world currently spends on 20 years worth of armaments.

Somebody else said it would be easier to reflect the sun's heat back from the surface of the earth. Trillions of white polystyrene balls floating on the world's oceans might do it.

Or we could paint the deserts white. Geologists take a different tack. There is (very expensive) technology available to remove CO_2 from the chimneys of power stations and convert it into liquid carbon dioxide. We could then bury the liquid into old coal mines or oil wells or pour it into sinking ocean currents that would take our pollution into the sea bottom. Scientists have drawn up maps of vast networks of pipelines spreading from the world's industrial centres to coastlines in order to accomplish this task. It might double the price of electricity, they say.

Biologists get in on the act too. One of nature's own methods of recycling CO_2 from the air is to absorb it in the oceans, where it feeds the growth of algae. Up to half the carbon dioxide that we put into the atmosphere today quickly ends up in the oceans. Why not help the process along? In some parts of the oceans, the growth of algae seems to be limited by the amount of iron in the water. So we could sprinkle iron filings on the sea and see what happens.

"Ever heard of the techno-fix, the idea that science can solve all our problems? What if it's not true?"

Graphic The Africa File, VIDEA

Another idea that popped up recently is to build giant lagoons along the world's coastlines, where algae could be intensively farmed: 220,000 square kilometres of lagoons would just about do it. The author suggested that it was more feasible than a terrestrial version of the same trick — planting giant forests everywhere, on the grounds that trees too absorb carbon dioxide.

All but one of the above ideas are regarded in serious circles as deeply unserious. The exception is tree planting. At the rate we are going, the world will run out of tropical forests before many decades are past. Isn't it time we planted some more? Some estimates suggest that we could damp down most of the global warming of the next half century or so with new forests the size of the US.

But watch out if you are invited to support the idea of planting lots of trees to help reduce the greenhouse effect. Vast monoculture plantations of fast-growing eucalyptus and acacia are already popping up across the tropics, sponsored by the World Bank or companies like Shell, and for entirely commercial reasons. These plantations are nothing like the real thing. They have no undergrowth, no fruit trees or dead wood or animals — none of the things that make natural forests of value to rural people throughout the tropics. Instead they have fences and guards. That is why they have inspired massive protest movements in India and, more recently, in Thailand. If we need more trees to soak up the rich world's pollution then they should be planted in the rich world.

Amid all the talk of 'technical fixes', we forget that the most obvious methods of responding to the greenhouse effect are probably the best and cheapest. One recent study of 'greenhouse solutions' by a US physics professor started from the premise that 'reducing our energy usage is not an option'. But it is. All the technology for saving energy already exists; it just needs applying. It could be brought in on schedule, with no big changes in our lifestyle and at no real cost. But we could go even further. Why not spend the next 15 years investing in even better energy technologies; there's lots more potential in geothermal, solar and wind power.

And if we were really feeling brave, we could start thinking about bigger changes to the way we live. Like finding ways to allow people to live close to their work (thus cutting down the need for CO_2-producing cars). By comparison with grandiose scientific cures all this seems very dull. Afterwards we would probably say: 'What was all the fuss about? Why didn't we do it before?'

But it always takes a shock to change things. Only the great London smog of 1952 (when more than 4,000 people died within a week from air pollution) jolted the UK to introduce clean-air laws. Now, perhaps a few scary stories about the greenhouse effect may encourage us to do some extremely obvious things about the way we use energy.

Fred Pearce wrote *Turning up the Heat: our perilous future in the Global Greenhouse*. He has just finished Green Warriors, a book about the international green movement.

Reprinted from the New Internationalist, April 1990

The fridge, the greenhouse and the carbon sink

Anil Agarwal and Sunita Narain take a swipe at environmental imperialism and make some radical proposals for change.

THE dream of every Chinese to own a refrigerator has become the nightmare of every Northern environmentalist. The fear is that the potential for increased consumption — and therefore pollution — in the South is now the biggest threat facing the world's environment. And so hysteria has built up in the North about even the minuscule resources the South is currently using.

Much less effort has been made in the North to look at things as they actually are in the South. To do that you have to separate out, for example, 'survival emissions' of pollutants by the poor from 'luxury emissions' by the rich.

Can we really equate the gas-guzzling, air-polluting automobiles in Europe and North America — or, for that matter, anywhere in the Third World — with the harmful methane emissions of flatulent cattle and the fermenting rice fields of subsistence farmers in West Bengal or Thailand? Do these people not have a right to live? Just what kind of politics or morality is it, masquerading in the name of 'one worldism' and 'high-minded internationalism', that fails to make such crucial distinctions?

Nature serves two major economic functions — as a source of raw materials and as a sink for absorbing wastes. Sustainable development demands that we do not produce more carbon dioxide and methane than the earth's environment can absorb.

The question is, how should this global common — the global carbon dioxide and methane 'sinks' — be shared out? In a world that aspires to such lofty ideals as global justice, equity and sustainability, this vital global common must surely be shared equally, on a per capita basis.

Our calculations clearly show that there is one set of nations in the South that is emitting greenhouse gases well within its share, and another set in the North which is exceeding its limits by leaps and bounds.

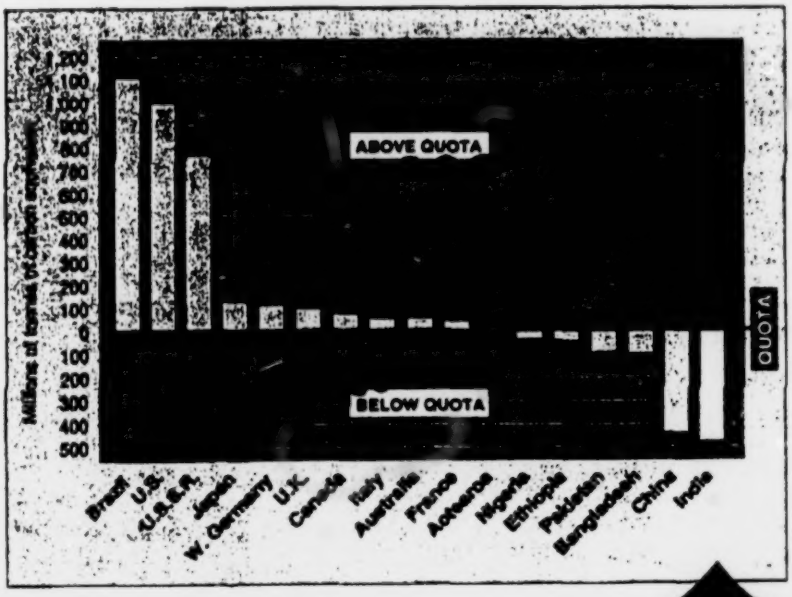
Pollution control economists are now talking about the concept of 'tradable emission quotas'. Total quotas should equal the world's natural sinks. Unused permissible emissions could then be sold to high-level greenhouse gas producers at a fixed rate. All over the world there is growing consciousness of 'Green Economics' and the need to incorporate the ecological costs of production into national income and wealth accounts.

But what is the point of doing this in a developing country if the rich and powerful consumers of the world are not prepared to pay the true costs of their consumption? That is not simply an economic issue but an intensely political one.

The same Western politicians who talk so glibly about an interdependent world show no interest at all in the travails of the Third World. For many of them international environmental issues are an easy way to divert attention away from domestic environmental issues.

Given the East-West detente and the growing power of the global market system, Third World politicians cannot afford to negotiate badly,

The carbon league



cheaply or in ignorance, forsaking the interests of future generations for some Meryl Streep-like mushy environmentalism beamed by satellite into Indian homes in the name of education.

Can we really equate the gas-guzzling, air polluting automobiles ... with the harmful methane emissions of flatulent cattle and the fermenting rice fields of subsistence farmers in West Bengal or Thailand?

The Third World has to propose an agenda of its own — to present its own concept of a sustainable future, to win the support, the hearts and minds of green youth across the world, in the Third World as well as the West.

The Western media will fête any Third World politician who speaks on environmental issues as Westerners do and accepts their brand of high-sounding but as yet hypocritical 'one worldism'. There will be TV appearances, newspaper interviews, invitations to conferences, Western-style money, fame and fortune across the globe. It is easy enough to sell out the interests of future generations in the glib name of global environmentalism and global charity. For the poor it will remain a harsh and vicious world which is not prepared to give them a fair place.

Anil Agarwal is director of the Centre for Science and Environment, New Delhi, where Sunita Narain also works. They are co-authors of *Global Warming in an Unequal World: a Case of Environmental Colonialism*, Centre for Science and Environment, New Delhi, India

Reprinted from the New Internationalist, April 1992

Graphic: Reprinted from Times-Colonist, June 3, 1992

"Should the rights of humans take precedence over the rights of animals and the environment?"

YES Human rights or animal rights — is there a question? Only a small fraction of the people on earth have the benefit of rights. First of all, the concept of human rights is a complex and fairly recent phenomenon. We have not really sorted out this notion of rights as it relates to humans, never mind animals. Second, it would seem reasonable to expect the recipient of rights to have some concept of what rights are and the responsibilities associated with the assumption of rights. Animals, other than man, do not have the capability to understand the concept of rights.

This is not to say that animals should not be dealt with humanely and with consideration. Cruelty to animals is not acceptable, and we have the law and organizations such as the SPCA go deal with this issue.

However, bringing the environment into the debate introduces a rather different set of ideas. Man is an integral part of the environment. Modern man is, however, different from most other species in that he has the ability to make conscious, significant changes to the environment and to understand at least some of the consequences of his actions.

In times past, man has made changes to his environment, generally aimed at improving his quality of life, with little thought to the impact on other species or to the planet as a whole. Due to a much lower population and limited technology, the changes man made were not overly damaging to the environment. More recently, with a vastly increased world population and a whole array of new technology, man's impact on the environment has become much more significant.

Forget the idea that man can go back to a simple agrarian lifestyle. The current population of the world precludes this option. In order to feed, clothes, shelter, educate and provide health care for the world's growing population, we have no option but to apply a high level of technology to all aspects of our society. It is possible to moderate the lifestyle of the developed western world, but satisfying even the most modest needs of the Third World will quickly overtake any savings that are made.

If vast areas of the world must be managed or farmed for commodity production, if minerals have to be mined, forests harvested, factories operated, and cities expanded just to meet the basic needs of the world's expanding population, the conclusions become obvious.

Agriculture and farming change vast areas from natural habitat to farmland. The original inhabitants, both plant and animal, are replaced with cattle, chickens, wheat, corn, carrots and whatever, but the original inhabitants are gone. Urban development also replaces what was once natural plant and wildlife habitats with office buildings, schools, churches and homes for people. Again, the original inhabitants are gone. Industrial developments, hydro-electric dams, ports and foreshore developments all have an impact on the natural environment.

Should the rights of humans take precedence over animals and the environment? The bottom line is that the NEEDS and WANTS of humans have taken precedence over animals and the environment. The question is not if it is right or wrong, but rather how we much now manage the environment for the long-term survival of the human race.

Mr. George and Mr. Jones respond

In 550 words, Mr. Carradice epitomized what is wrong with the values and actions of modern, western industrialism. He asserts that the concept of human rights is a recent phenomenon, that we haven't yet sorted out what rights humans should have, never mind animals.

He is totally wrong. Although we use tools and communicate verbally, humans are fundamentally animals. Hunting and gathering bands, the universal pattern of human society for millennia before agriculture developed, thrived because everyone shared everything they had with everyone else in the band. They were egalitarian and made survival decisions on considering everyone's point of view. They also understood that they were a part of, not apart from, or above, the environment. They shared their food, space and lives with other creatures and other creatures shared like-wise. The fact that all life is interdependent remains true, despite modern technology.

Humans began as stewards of the environment and our species will survive only if we revive this attitude.

Just because there are amoral faceless ones who run multinational companies on the principle of extracting the maximum profit for themselves and their shareholders, despite the consequence to other humans and the earth, and there are military dictators who trammel the rights of others, doesn't mean that human rights haven't been identified and are unreal.

Among the inalienable rights are those of the unborn for generations to come. They are entitled to an earth with clean air, pure water, healthy soil and fully-specied, vibrant life-supporting ecosystems. Business as usual will not provide these. Current industrial activities, deforestation, and atmospheric dumping, for example, are a gradual form of ecocide. All rights of all living things are gone on a dead planet.

Western Canada Wilderness Committee stands for alternatives: recycling, waste reduction, selective logging, organic farming, solar energy, wealth sharing with developing nations, and protection of wilderness to preserve diverse life systems.
Respect life. Respect others' cultures. Give up defending the status quo. Even you can change for the positive, Mr. Carradice.

A Debate Between Jack Carradice, B.C. Environmental Information Institute, and Paul George and Gray Jones, Western Canada Wilderness Committee.

NO The question, "Should the rights of humans take precedence over animals and the environment?", is a lose-lose proposition. Which-ever side you perceive yourself to be on, your position leads to conflict and increased destruction of the planet. If you are sitting on the sidelines of life as an observer, mourn equally for people starving in Ethiopia, for the impending extinction of the elephant, and for the destruction of the earth's tropical rainforest — the mother of our weather systems and the world's medicine chest.

At the Western Canada Wilderness Committee, we do not mourn. We act to preserve the life of the planet in its splendid array of ecosystems and the cultures of indigenous peoples. We do not believe that it is a choice as to whether or not to act. It is a duty. We believe that people are aboriginal stewards of the earth, not alien conquerors.

Let's approach the problem from the basics. All living beings, with the exception of some specialized bacteria but including humans, need: fresh water, fresh air and ozone protection to survive. Whether we like it or not, everything on the planet is interconnected. We are part of a closed ecosystem we call Planet Earth. We humans are animals, albeit with big brains, but not separate entities outside the laws of nature. When we damage the earth's ecosystems, cause species to become extinct, we are hurting ourselves. The quote attributed to Chief Seattle sums it up. *Whatever befalls earth, befalls the children of earth. We are the dependents of this planet and will forever remain so.*

Do we have a right to use the water? Of course. Do we have a right to deplete and pollute the groundwater of an entire nation, as they have in the United States where their underground aquifers are becoming polluted with man-made organic chemicals and have been extremely diminished? No! A once-inexhaustible resource, fresh water, is now thought to be non-renewable.

The biodiversity of the earth is its first and foremost heritage. At Western Canada Wilderness Committee, we believe that large tracts of wilderness, where people may live but where the working of nature predominates, are the hope for the future. Included are ocean wildernesses, tropical and temperate rainforest watersheds, and, in Alberta, huge tracts of oxygen producing, carbon-fixing boreal forest that are helping to stave of a runaway trend toward global warming.

Animal rights, native rights and the rights of unborn children come before the rights of soulless multinational companies that exploit and destroy nature for profit and a consumer-oriented way of life, that is unsustainable and threatening the whole life of the Planet. In the end, the fight for the survival of other species is a fight for the survival of our own species. Environmental protection and the protection of animals, forests, water and air may reduce short-term gain, but in the long run, especially for our children, it makes good economic as well as environmental sense. There are no profits, no jobs, on a dead planet.

Reprinted from BC Report, May 25, 1992

Mr. Carradice responds

Thoughtful, responsible people will be offended by the mixture of half-truths and hysteria in the Western Canada Wilderness Committee essay. The preservation of our environment is a serious matter that requires careful thought and action based on the best scientific information.

Quoting Chief Seattle, whose words, according to current researchers, were written by a Hollywood scriptwriter, is not constructive.

Blaming multinational corporations for the problems of the world has become a knee-jerk reaction of the spokesmen for the multinational environmental activism industry. All companies perform in accordance with the standards established and enforced by duly elected, democratic governments, at least in western society.

Is it the honest, hard-working, people in our society — who are doing their very best to provide good homes and raise decent families — who are being accused of sitting on the sidelines of life? Shame! The working people of this country and the people in the business community are fully aware of the need to preserve our environment and also of the necessity to maintain a sound economy if responsible environmental management is to be achieved.

One of man's primary challenges is caring for the world's increasing population. Current population figures preclude a return to a simple, agrarian lifestyle. Just to provide the basic necessities will require every bit of science, technology and ingenuity mankind can muster.

Thankfully, mankind is not standing still. Significant advances have been made over the years and many more improvements can be expected. These improvements will come through a better-informed public and by maintaining the economic health essential to funding the changes that must be made.

Yes, man has a responsibility to maintain the environment, to preserve the richness and diversity we enjoy. We all want a clean, healthy and diverse environment, but the solutions lie in correctly identifying the challenges and in devising practical ways of handling them, not by quoting mindless drivel or playing Tarzan in the wilderness, as advocated by the spokesmen for the environmental activism industry.

GLOBAL WARMING

Too much of a good thing?

If the world's atmosphere did not act naturally like a greenhouse, life on earth would not be possible. The greenhouse effect has kept the planet at an average temperature of about 13°C warmer than it otherwise would be. But human activities are upsetting the balance in two drastic ways. First, we release extra carbon dioxide by burning huge quantities of fossil fuels and we pump methane and CFCs into the atmosphere. Second, we are destroying forests, which act as a sink to absorb excess carbon dioxide. To some experts, the possibility of climate change overrides all other environmental issues. The problem is also without precedent. Never before has humankind been able to interfere so extensively with the planet's basic life-support systems. It is generally accepted that increasing greenhouse gases in the atmosphere will make the Earth warmer. Despite the scientific community being divided over how much global warming has occurred, how much is still to come, and what the climatic consequences will be, a growing consensus seems to be emerging.

Heat reflects off the Earth, but is then unable to escape the Earth's atmosphere because of the insulating greenhouse gases in the atmosphere.

Sources

Greenhouse gases are distributed widely around the world, with the burning of fossil fuels (coal, oil and gas) and industrial use of CFCs being the biggest sources. These are followed by deforestation and agricultural activities such as land clearance, rice paddy cultivation, livestock production and increased use of fertilizers. Overall, industrial countries account for 55 per cent of the increase, but the developing countries' share is steadily increasing.

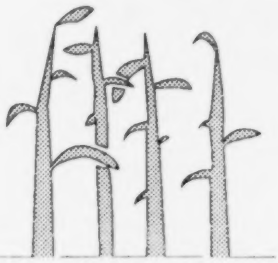
Altogether, the world added about 6.5 billion tonnes of carbon — as carbon dioxide or other heat-trapping gases — to the atmosphere in 1987, the last year for which complete figures exist. That amounts to about 1.25 tonnes of carbon for every human being on this planet. But not every citizen or every country shares the responsibility equally. A 'Greenhouse Index' that ranks countries based on emissions of heat-trapping gases finds the United States at the top of the list, followed by the Commonwealth of Independent States, Brazil, China, India, Japan and Germany, with Canada coming twelfth after Italy. Ranked by the Greenhouse Index, every major region of the world and every continent are represented in the top 50 countries; all except Africa are represented in the top twenty. Global warming is truly a global problem.

The major causes reside in human population growth and the world's insatiable appetite for energy. Energy use has grown tenfold in the last 90 years, most of it through an increase in fossil fuels. In the period from 1860 to 1987, the total release of carbon from human activities equals an estimated 241 billion tonnes.

Reprinted from Development, Spring 1992

FROM FARMLAND TO WASTELAND

"It sure seems hotter than it used to."



So, what's the big deal about a couple of degrees Celsius? Most people can't tell the difference between 28°C and 30°C, so why is everyone so worried about the Greenhouse Effect which scientists predict will raise the world's temperature by 1°C to 5°C over the next century? The reason for the concern is that even small average temperature changes can have a really dramatic effect.

Climate zones will shift, sea levels will rise as the polar ice caps melt releasing the water locked in them to the oceans, and weather patterns will be altered all over the globe. All of those changes will have an enormous impact on food production.

In some places, good quality farmland will turn into barren desert, in others, fertile river deltas will disappear under seawater.

The experts studying the Greenhouse Effect expect Canada's wheat harvest to drop by about 18%. Farmers in southern Alberta and Saskatchewan would be the big losers, as their areas would get less rain. However, farmers in southern Manitoba would be winners because their zone would be warmer and would get more rain. The fall in crop yields in the United States midwestern grain belt could be higher, perhaps 33%. Given that the U.S. exports meet 40% of the world's corn demand and 75% of its wheat needs, a drop of one third in its production would be a catastrophe.

That's the doom and gloom scenario. The optimists say that places where farming is not possible today might come into production in a warmer world. The prediction is that global warming will move North American agricultural zones about 550 km to the north. So, Canada's Arctic might replace the U.S. midwest as the world's bread basket.

But, hopes for a positive outcome from the Greenhouse Effect are dashed again by the scientists. They point out that Arctic topsoil is neither deep enough nor of good enough quality to support farming on a prairie scale.

What seems most likely is a decline in the availability of grains for world consumption. A fall in supply without a fall in demand always leads to a rise in price. Good news for farmers and grain exporters perhaps, but very bad news for the world's poorest nations. They will be squeezed out of the market by countries that can afford to pay the going price. One of these countries will be the United States, which will no longer be self-sufficient in grain because of its one-third drop in output.

Because of bigger populations, changing climates, and soil degradation the famines we have seen recently in Ethiopia and Sudan could look like sideshows to the main event that lies ahead. And, the rich, well fed nations of the world will be less able to help with emergency food aid. Starvation on a catastrophic scale seems unavoidable. The areas likely to be hardest hit are those that are already dry and marginal — sub-Saharan Africa, India, Pakistan, and northeastern Brazil. In all these regions deserts are predicted to spread as higher temperatures draw what little moisture there is out of the land.

The irony is that in that world of the future where parched land will refuse to yield a crop there will, in fact, be more water. The problem is it will be the wrong kind of water in all the wrong places. Coastal plains and river deltas are some of the most fertile areas in the world. Over thousands of years, rivers have deposited rich silt laden with nutrients on low-lying coastal land. Abundant crops now grow on this land. But global warming will lead to a rise in sea levels around the world of between one and two metres within about 100 years.

As with the predictions for higher temperatures, one to two metres doesn't sound like a lot; even at the high end a basketball player could still keep his head above water. However, it's enough to totally submerge the island nation of the Maldives in the Indian Ocean. And someone has worked out that it would cost the United States US$300 billion to hold the water back on its east coast alone. Such an undertaking would stretch the resources of the mighty United States. Imagine trying to cope with the problems facing Bangladesh, one of the world's poorest countries.

About 14% of Bangladesh's agricultural land would disappear under the waves of just a one-metre in sea level. Such a rise would also displace 17 million Bangladeshis who would have nowhere to go in an already overcrowded country (117 million people are squeezed into an area about a quarter the size of Saskatchewan).

But there's worse. Warmer oceans could make tropical storms stronger say the climatologists. We had graphic evidence of what such a storm can do last spring. In May, a cyclone born in the Bay of Bengal, slammed into the coast of Bangladesh. When the tidal waves and wind dropped, 125,000 people were dead. And this after improvements to the country's ability to cope with cyclones following a death toll of half a million in a 1970 storm. Clearly, Bangladesh simply cannot protect its people from the stronger cyclones that lie in its future.

Almost everything we've written about so far seems to be unavoidable. There's a trend line on which global

22 A

temperatures are steadily rising. Seven of the ten hottest years since records began to be kept have occurred since 1978; 1990 was the warmest year ever recorded. The world's average temperature has increased by 0.5°C since 1900. If emissions of greenhouse gases hold steady the rate of increase in the warming rate could start to slow down in 30 years. But emissions are still jumping by about 3% a year, and all the indicators point to an even faster rate of increase in the future. At this point, we run into heavy-duty bad news.

Scientists fear the double-whammy effect of a faster growth in greenhouse gas releases and a continued loss of forests. Fewer trees means less carbon dioxide (a major greenhouse gas) being absorbed through photosynthesis. At some point in the warming cycle, vast quantities of methane (another greenhouse gas) frozen in Arctic tundra could be released. Things could start to accelerate to the point where absolutely nothing could be done to slow it down, and humankind's only hope would be to find another habitable planet.

There's one small sliver of hope we can cling to. Just this summer, scientist announced they'd discovered what amounts to a natural thermostat over the Pacific Ocean. Two climatologists in California studied an event called El Niño in 1987. During this periodic happening, the surface temperature of the eastern Pacific suddenly warms up by 8°C to 10°C. The warmer sea releases more moisture through evaporation to form clouds. Normally, increased clouds would mean more heat trapped in; however, during El Niño huge very thick clouds are formed. This white blanket reflects more of the Sun's heat back out into space, in effect cooling the air and sea below them.

The scientists who discovered this phenomenon are quick to point out that thermostat effect may be local and can't be relied upon on a global scale. In the meantime, our best hope is to very drastically cut the greenhouse gases we are emitting.

Suggested Activities:

1. What is your province doing to reduce the emission of greenhouse gases? Contact your provincial environment ministry for information.

2. Draw a schematic diagram to illustrate the greenhouse effect and its impact on food production.

Rupert J. Taylor

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Obsession with ozone is harmful

Industry leader fears Canada will pay a tough price

By Andy Marshall (Herald writer)

Our obsession with global warming could harm this country, and it distracts our attention from far more crucial environmental issues, says a Canadian energy industry leader.

Although scientific doubts still linger over the impact of carbon dioxide and other gas emissions on the earth's atmosphere, "environmentalists have hijacked the issue ... they've made it the most sensational issue since global cooling," says Giacomo Capobianco, president of The Coal Association of Canada.

As a result, at the United Nations earth summit in June, Canada may be forced to accept "unrealistic" targets for greenhouse gas emissions. This could have severe impacts on the country's economy — dependent on fossil-fuel energy sources like no other nation in the world.

"We just don't know the costs that some amorphous regulations may impose on us," warned Capobianco, who was in the association's Calgary office this week. He was referring to proposals for the Rio de Janeiro conference which would require all countries to stabilize carbon dioxide emissions at 1990 levels by 2000.

"For environmentalists to say, 'We don't care what it costs,' that's wrong."

Capobianco is a member of the advisory committee to Canada's negotiating team on the World Climate Change Agreement. He will speak at the Globe '92 environment conference in Vancouver next week and has been invited to give a paper to an Organization of Petroleum Exporting Countries (OPEC) seminar on the environment in April.

He points to mass starvation or widespread death from polluted water as far more deserving of international action. He also acknowledges that the coal industry, a significant but sharply declining producer of greenhouse gases, has a self-interest in downplaying the dangers of global warming. "But, do the environmentalists have no ulterior motives?" he asked. The issue has given them a "tremendous international profile."

In the meantime, Canadian society watches from the sidelines, still unwilling or unable to understand the economic implications of stricter environmental standards.

We cannot think of saving the earth without a fuller accounting of our "materialistic hedonism" or our push for unrestrained population growth.

"We have to understand the economic side, too," said Capobianco.

Owen Saunders, executive director of the Calgary-based Canadian Institute of Resources Law, agrees society has made little progress in reconciling stricter environmental conduct with lifestyle expectations.

"We've only talked in general terms ... this has to be spelled out," he said. "But mainstream environmental groups are realising this."

Saunders also agreed that knowledge about global warming remains uncertain. But, when dealing with uncertainty, "there is a principle of assuming the worst and basing policies on that."

Reprinted from the Calgary Herald, March 16, 1992

EARTH'S OZONE S H I E L D

The ozone layer may seem remote, but in reality it is only 15 km away; from Beacon Hill Park, the ozone layer is as close as Elk Lake.

Naturally occurring ozone in the Earth's upper atmosphere ("stratosphere") shields living organisms from harmful short-wave ultraviolet radiation from the sun. The ozone layer is therefore essential to survival of life on the planet, but it is now being depleted at a rapid rate by industrially produced chemicals, called halocarbons.

What are these chemicals and where are they from?

Halocarbons, the ozone-depleting compounds, are manufactured chemicals. They include chlorofluorocarbons (CFC's), halons, and chlorocarbons. They are widely used for refrigeration and air conditioning (including automobile air conditioners), in the manufacture of foam products, and as solvents. Halon is used in some fire extinguishers.

Car air conditioners lose about 40% of their coolant annually. The major coolant is a CFC which not only destroys the ozone layer but also is one of the most powerful greenhouse gases.

What's the difference between stratospheric ozone and low level ozone (smog)?

Ozone produced at ground level (as a reaction of car exhaust and sunshine) does not help repair the missing ozone in the upper atmosphere. Because ozone is highly reactive, it is very short-lived; it breaks down before it can reach the upper atmosphere.

THE FACTS...

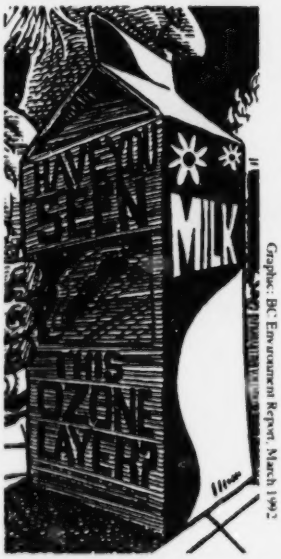
About Ozone Depletion

FACT: In 1985 a hole the size of the U.S. was discovered in the ozone layer over Antarctica. Each subsequent spring, decreases in ozone of up to 40% have been recorded over Antarctica. In 1991 NASA reported surprising ozone decreases of up to 4-5% per decade over North America and Europe. Globally, ozone is decreasing by 2.3% per decade.

FACT: There is a lag period of many years for our ozone-depleting chemicals to destroy the ozone in the upper atmosphere. The present observations of ozone thinning result from releases of CFCs and other ozone-depleting chemicals in the 1960s and 1970s. We have yet to see the results of releases from the 1980s.

FACT: We don't know how to patch up holes in the ozone layer.

The good news is that according to many scientists, the ozone layer can eventually repair itself. Unfortunately, this could take several decades or centuries.



Graphic: BC Environment Report, March 1992

Effects of Ozone Depletion

Increased ultraviolet radiation (UV) will cause:

- millions of new cases of skin cancer and eye cataracts;
- weakening of the immune system;
- damage to crops, trees and other plants; damage to ocean algae and phytoplankton (Foundation of food web);
- increased smog and acid rain.

Probably most critical to our survival is the threat of disruption to ocean, land and forest ecosystems; ozone destruction hampers the ability of many plants to absorb CO_2 for photosynthesis. This could threaten our food supply.

So what can we do about the ozone layer?

The important thing is:

- to stop production of halocarbons as soon as we possibly can,
- to recycle all the halocarbons currently in use, and
- to wait for the ozone layer to repair itself.

The BC Government has drafted legislation on ozone-depleting chemicals. The draft legislation proposes to regulate the handling and disposal of ozone depleting substances. If this legislation passes, it may reduce or eliminate the need for municipal action.

However, there are many CFC's in our community, e.g. in car air conditioners, refrigerators and rigid foams, which individuals will have to safely recycle.

B.C. Hydro will pay you $50 for your refrigerator and will recycle the CFC's. Call 1-800-663-2274.

Reprinted from CRD Health Atmosphere 2000 - a discussion paper

BRAVE NEW BTUs

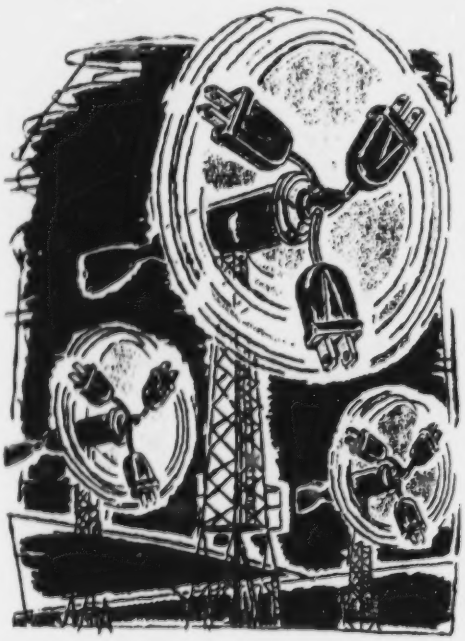
Can Science Cure Our Energy Ills?

To some environmentalists, hoping for a grand technological fix for the world's energy dilemma is like waiting for Godot. We can't wait around for whiz-bang solutions, they say; if we simply use less energy, we'll create fewer energy related problems. It's an iron-clad blend of skepticism and pragmatism, hardened by years of undelivered promises.

But many technological solutions with real promise get a bad rap. Yes, technology has brought us nuclear power plants (and nuclear waste with nowhere to go) as well as the gasoline engine (and greenhouse gases with nowhere to go). But most of us like being able to heat a kettle of water without first having to build a fire from cow dung. A civilization that rents out seats on space flights to television reporters need not make its citizens shiver to save energy.

Fortunately energy efficiency and well-designed technology go hand in hand. While we can reduce consumption (by throwing away our car keys, for example), less austere solutions include putting advances in electronics and materials to work in designing more efficient vehicles and cities. Perhaps someday we can even make good on the "space-age" promises of fully automated offices and homes, or guided roadways that propel vehicles using benign energy sources. What follows is a look at a few of the technologies — some proven and merely waiting for political and economic support to succeed, and some existing only on paper — that might help ease us away from our dependence on fossil fuels.

Wind

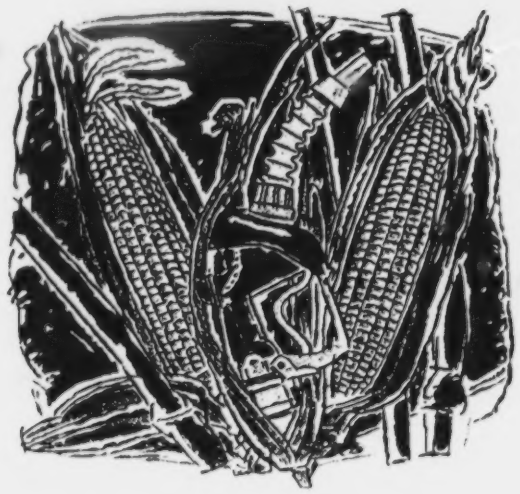


Graphic: Ward Shumaker Illustrations

Energy from the best wind technology is already nearly as cheap as that from conventional energy sources — an all-important benchmark of about six to eight cents per kilowatt-hour. (A California residence that relies on electricity for all its energy needs can be expected to use about 800 kilowatt-hours per month.) Already, 1.5 million kilowatts of electricity are generated by California wind farms, and increasingly sophisticated blade materials and designs are being developed to produce even more power with greater efficiency. The disadvantages: So far, wind farms earn their keep only in areas with consistently strong winds (averaging more than 12 miles per hour); they require considerable amounts of land (although the land can be used for other purposes at the same time); and they have been known to kill unsuspecting birds.

Solar Thermal

The fastest-growing large-scale method of harnessing solar energy, solar-thermal technology produces about 350 megawatts of power at several plants in California's Mojave Desert. The cost of electricity from these plants is competitive with Southern California's "peak power" rates (what's charged when electrical demand is greatest — for example, in the late afternoon). It's estimated that if the environmental costs of conventional energy sources were considered, solar thermal would already be on an equal footing with lower "base power" rates. Using a variety of techniques, solar-thermal systems collect the sun's energy and use it to heat a fluid to as much as 3,600 degrees Fahrenheit. The heat can be used to generate steam, which can then be used by boiler plants to produce heat or electricity. Like



Graphic: Ward Shumaker Illustrations

wind and most other solar technologies, solar thermal's effect on the environment is relatively slight: Once in operation these facilities release essentially no pollution and generate no waste. Solar-thermal systems take up large amounts of land, however, and they're built primarily from high-tech components, the manufacture of which (at least for now) is often polluting.

Photovoltaics

While solar-thermal technology converts the sun's energy into electricity indirectly, photovoltaic technology does it directly: Light is converted into electricity when it hits a special type of solid-state cell composed of thin layers of semi-conductor material. Solar cells have become increasingly economical; within two decades, perhaps, declining production costs and increasing cell efficiency will make them cost-effective for utility-scale uses. These nearly maintenance-free systems already earn their keep in virtually any location not hooked up to an electric-utility system, and in consumer goods such as calculators, watches, and walkway lights. As with solar-thermal technology, photovoltaic systems are benign once in operation, but their production relies on a potentially messy combination of high-tech materials.

Geothermal Energy

These systems tap heat generated by natural processes underground. They are already in use in New Zealand, Iceland, Italy, the Philippines, and California (where geothermal steam generates about 2 million kilowatts), and under development in Central America, the Soviet Union, and elsewhere. Unfortunately, geothermal resources are commonly found in volcanic areas — often some of the most pristine sites on Earth. With more advanced technology, geothermal energy could be extracted from underground masses of hot rock, a nearly limitless resource.

Biomass Energy

Biomass is any plant matter that stores the sun's energy through photosynthesis. It can be converted into practical energy simply (by burning wood for heat, for example) or by using complex systems that gasify plant matter and run it through turbine generators to make electricity. In its most primitive forms, biomass is the main source of energy for nearly half the world. It's available anywhere that plants can grow, and (if produced sustainably) adds no carbon dioxide to the environment. Though plentiful, biomass has its limitations: It's a relatively inefficient storehouse of energy, and in many parts of the world it would consume acreage probably best used to grow food crops or left in a wild state.

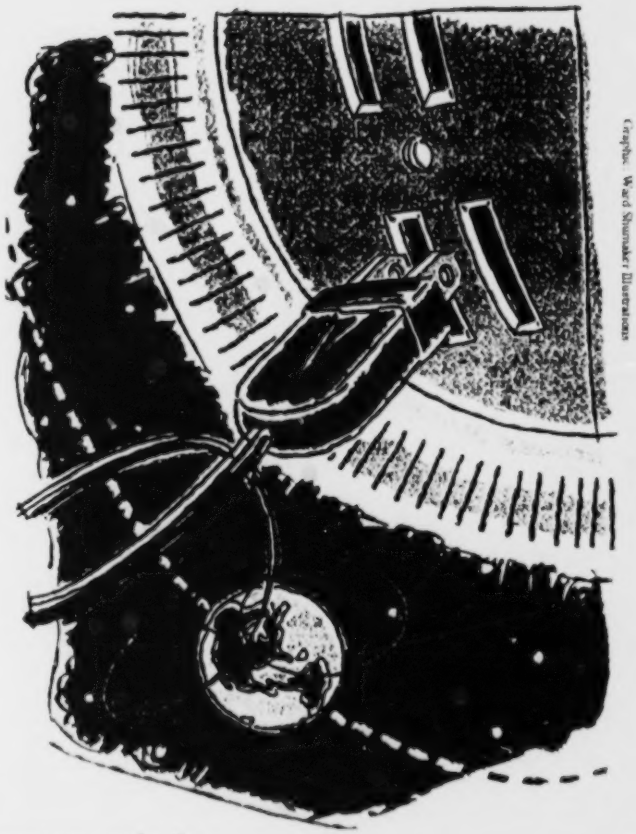
Biomass is the only renewable energy source capable of producing premium liquid and gas fuels (primarily ethanol) that are already workable alternatives to oil, coal, and natural gas. (Methanol, a much-vaunted alternative fuel, is only a partial solution to our energy problems, since it is very toxic and most often made from natural gas or coal.) In the United States, corn-ethanol production survives only with significant subsidies. Production of ethanol from cane sugar in the tropics is much more attractive, however, because the conversion process is more efficient, land and labor are cheaper, and biomass growth rates are higher. (About half of Brazil's cars run on ethanol made from sugar cane.) The operation can be made even more efficient if the waste can be burned to make electricity at the same time. It's more difficult and expensive to extract ethanol from woody crops, but the technologies do exist. A process called enzyme hydrolysis could make biomass-based alcohol fuels more competitive in the United States.

Efficient Design

This is a huge area with great conservation potential anywhere energy is used, such as in motors (for everything from home appliances to factory-floor machinery), automobile engines, lighting, space conditioning, and refrigeration. About half of all energy used in the United States is wasted, and improved efficiency is the cheapest source of "new" energy — although it's not necessarily the easiest to implement. Advances in electronics, manufacturing processes, and complex materials continually conspire to make designed-in energy efficiency less expensive. On a larger scale, the development of super-efficient electric transmission techniques and storage methods can further increase energy savings. (Unlike liquid and gas fuels, electricity is difficult to store.) "Superconductive" materials being developed reduce electrical resistance nearly to zero; they could maximize the efficiency of electrical wires and provide an effective medium for storing power.

Solar Hydrogen

Sometime after the year 2000, perhaps, hydrogen fuel produced with solar energy could become the antidote to our fossil-fuel addiction. Hydrogen combustion emits no carbon monoxide, volatile organic compounds, particulates, sulfur dioxide, or carbon dioxide. The only by-products are water vapor and controllable levels of nitrogen oxide. One way to produce hydrogen fuel is by electrolysis — splitting water molecules into hydrogen and oxygen. The key question is where the power for this process will come from. Depending on whom you talk to, the answer could be electricity from nuclear as well as solar sources. Once photovoltaic systems become cost-effective, they could provide the energy for electrolysis.



Graphic: Ward Shumaker Illustration

Nuclear Fusion

You have to be a true optimist to count on fusion, especially after 1989's "fusion-in-a-jar" fiasco. But it's a tempting idea: Whereas fission creates energy by splitting atoms, fusion joins them together. Enormous amounts of energy are released when the nuclei of two hydrogen isotopes, deuterium and tritium, are fused. Deuterium is a component of water; tritium can be made from naturally occurring lithium and, while radioactive, has only a 12-year half-life. In theory, fusion's only waste product is the inert gas helium. To no one's surprise, however, the technology has serious problems: Using current methods, radioactive waste will be produced, and neutrons that escape during the process make the reactor radioactive. The biggest stumbling block is getting the positively charged nuclei of the hydrogen isotopes to attract each other, which normally occurs only at extremely high temperatures. Fusion occurs naturally in the sun, but it has proved elusive to reproduce under controlled conditions. The hydrogen bomb is the most dramatic example of uncontrolled fusion.

Solar Energy in Space

On paper it's appealing; a huge structure containing 10 billion solar cells floating about in high orbit would collect solar energy, convert it into electricity, and beam it to Earth as microwaves. The atmosphere wouldn't block the sun's rays, and collection could take place 24 hours a day. The best estimate of when the right mix of cheap photovoltaics will coincide with regular cargo shuttles into space puts application of this idea deep into the 21st century, however.

Tapping the Tides

There are endless schemes for exploiting the enormous (but erratic) power of tides, waves, and currents. Tidal power can be harnessed with much of the technology already in use for hydroelectric projects, but it's still very expensive, and effects on local environments can be just as great. In Norway, the world's first commercial wave-energy plant generates 850 kilowatts of electricity. There wave pressure acts like a piston, pushing air in a shaft through an electricity generating turbine. Another idea that's been successful on a small scale is ocean-thermal-energy conversion, a technology that taps the temperature differences between deep sea water and the sun-warmed surface in tropical oceans to generate electricity.

Cogeneration

Only a third of the energy from a boiler in a conventional power plant is converted to electricity. The wasted heat can be tapped by "cogenerators" to produce both heat and electricity. Because cogenerators are usually fired by oil or natural gas, the process isn't really a "fix" for fossil-fuel dependency, but it uses conventional resources more efficiently.

Reprinted with permission from the April 1991 issue of Sierra Magazine

Sun Power on the Steppe

Solar Electricity for Mongolia's Pastoral Nomads

It was an especially dark night on the steppe. In the elaborately furnished and decorated *ger* or *yurt*, their mobile home, Batsuuryn, her husband Sengyn, and other members of the family, listened intently to the explanations of Professor Chaadra, Vice-President of the Mongolian Academy of Sciences. Then Sengyn clicked a small switch on the sleek solar lamp, illuminating faces all around. No candle smoke, no oil smell. The tent was literally flooded with sunlight.

For the demonstration, the Unesco-commissioned specialist, Belgian engineer Bernard Delville, who accompanied Prof. Chaadra out onto the western steppe, provided a solar panel of 0.50 m2 collecting 60 Watts of energy, enough for two portable lamps, a radio, three hours of television a day, and a telephone transmitter-receiver.

Public lighting

Earlier, in Ulan Bator, the capital, with Mr. Bakhthusjag, Minister of Energy and Mining, the representative of UNDP and other invited dignitaries looking on, Delville conducted a still larger solar show. This time, in addition to the individual 60 W panel, he presented a small 220 W photovoltaic generator, modest, but big enough to furnish the power needs of a cluster of *gers*, including such conveniences as public lighting.

Mongolia is building a future of cities and factories. Yet the age-old tradition of pastoral nomadism still involves about 60 per cent of the population, some 1.2 million of a total two million people. Livestock raising and the processing of animal products are the country's main industries, dairy products, wool, hides, meat, textiles, leather goods, carpets, and luxurious camel's hair, its chief exports. An estimated 25 million animals, including over 14 million sheep, nearly 5 million goats, 2,500,000 head of cattle and about 600,000 camels graze the vast Mongolian pasture along with as many horses as people, partly because *airak*, the effervescent national drink, described as a "cross between buttermilk and champagne", is made from fermented mare's milk.

"Economically and culturally, it is almost unthinkable that such a population could become sedentary," said Delville. "Even technically, such an idea is absurd. It would mean the industrialization of grazing and a consequent drop in the number of animals, costly infrastructure and a radical change in methods which are now uniquely adapted to the steppe. Such an economically costly, and perhaps ecologically disastrous, gamble would above all destroy a way of life which is an essential part of Mongol Identity."

Today, the herders and their animals are organized into co-operatives. Families who used to move their *gers* on the backs of animals or on wagons can now generally count on co-op trucks to haul the collapsible lattice framework, the skins or felt to be stretched over it, the small painted door, and furnishings for the circular domed tents. In many ways life is easier on the steppe, not least because over 75 per cent of *ger* children attend boarding school -- a significant factor in boosting the country's literacy rate to nearly 90 per cent.

Rapid change

"Nonetheless," says Delville, "in a nation undergoing rapid change, the nomadic population has in many respects been left behind in another age — of oil lamps and candles, cut off from information and without adequate means of communication. The Mongolians are so musical, for instance, they like to think they invented it. If they have a radio, they will listen all day."

"The need for electricity in the *ger* is obvious," he adds. " Yet there is no way linking these people to the electricity grid. How could you wire the steppe? Imagine power lines marring the plains like a giant cobweb, or the intolerable noise of diesel generators, not to mention the pollution and the prohibitive cost of fuels."

According to Delville, photovoltaic electricity provides the perfect solution. "Mongolia, with its dry continental climate, annual rainfall of less than 15 inches (38.1 cm), few clouds and exceptional luminosity of the air, benefits from ideal conditions," he says. "The quality of sunlight over 300 days a year, is unique."

Bernard Delville studied to be a mining engineer, but switched to soft energies, particularly solar, 10 years ago, setting up his own small company, Kilocal. "No contradiction," he insists. "The sun, after all, is the biggest mine of all." Now 43, he was a product of the late 1960s, the "small planet" and "alternative futures" generation which saw solar energy as a promising alternative following the oil shocks of 1973 and 1976. " Unfortunately," he laments, "when oil prices dropped several years later, so did enthusiasm for the technology."

"Although we are often viewed as merchants of utopia, " he is still an unconditional advocate of solar energy as the best way to improve life in remote areas, thus stem the rural exodus and relieve urban congestion.

He suggests that the hardware for individual solar power units could be supplied to users who would pay a utility fee "the way most of us pay oil or gas bills", this "fragmented power system" would be comparable in Mongolia, for instance, to an 18 Megawatt plant (or more if isolated centres were electrified), that is, 250 to 300,000 *gers* multiplied by 60W.

Reporting back to Unesco Headquarters last month, Delville voiced his conviction that Mongolia has all the necessary conditions for success, including a laboratory already installed in the Institute of Science and Technology for experimental development and production of photovoltaic cells. "Exercising its role as catalyst, Unesco has demonstrated concrete applications. The rest is up to them."

After all, for Mongolia, whose intrepid horsemen led by Genghis Khan in the 13th century built one of the greatest empires the world has ever seen, harnessing the sun should be child's play.

Betty Werther

Reprinted from UNESCO Sources, February 1990

NUCLEAR ENERGY:

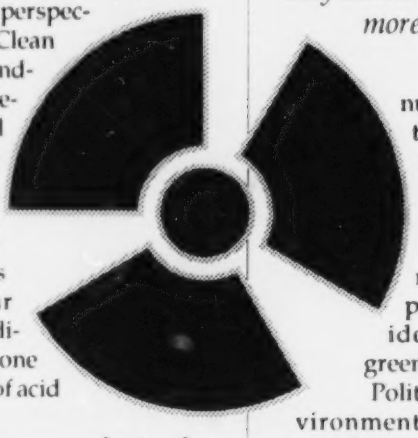
PLENTIFUL ELECTRICITY AND A CLEAN ENVIRONMENT

"From sea to shining sea," Americans today want a clean environment. The question is: How can we produce the energy we need, yet protect our clean air, lakes, streams, "shining seas" and other natural resources? For the answer, we must look to energy sources that are good for the environment.

Nuclear energy is one of these.

Nuclear power plants produce electricity by the fissioning of uranium, not the burning of fuels. So they do not pollute the air with sulfur dioxide, nitrogen oxide, dust or "greenhouse" gases like carbon dioxide. Making one million kilowatt-hours of electricity in a power plant fueled with natural gas produces 550 tons of carbon dioxide. Making the same amount of electricity in an oil-fired plant produces 850 tons of carbon dioxide; in a coal-fired plant, 1,100 tons. But making one million kilowatt-hours of electricity in a nuclear power plant produces zero carbon dioxide.

Nuclear energy has helped create a cleaner environment throughout the world. At the end of 1990, 418 nuclear power plants in 25 nations produced about 17 percent of the world's electricity. Between 1973 and 1989, nuclear power plants worldwide reduced emissions of carbon dioxide to the Earth's atmosphere by 5 percent. Those countries that rely heavily on nuclear power (like France) generally have the lowest carbon dioxide emissions. U.S. nuclear power plants have similar environmental benefits. In 1991 America's 111 nuclear power plants produced almost 22 percent of our electricity — enough to meet the needs of 65 million homes. Without them, electric utility emissions of carbon dioxide — one of the "greenhouse" gases — would have been 20 percent higher. Without our nuclear power plants, emissions of sulfur dioxide would be 4 million tons higher every year. To put this in perspective, the 1990 Clean Air Act amendments will reduce annual sulfur dioxide emissions from all sources by 10 million tons by the year 2000. (Sulfur dioxide may be one of the causes of acid rain.)



Nuclear power plants also eliminate 2 million tons of nitrogen oxide (NOx) emissions each year. NOx contributes to the formation of urban smog as well as acid rain. The new Clean Air Act requires NOx reductions of at least 2 million tons per year by the year 2000.

As our nation's need for electricity grows, nuclear energy can help meet that demand — without polluting our air. Nuclear power plants do produce radioactive waste by-products, but these wastes pose no threat to the environment. Nuclear waste is strictly managed and controlled, and carefully isolated from the environment at all times.

Reprinted with permission from the US Council for Energy Awareness

Back from the grave

Nuclear power is being dusted off and given new life as a sure-fire escape from the greenhouse. Stephen Hall argues that this is not only illusory but dangerous — it may distract us from infinitely more effective options.

ADVOCATES of nuclear power see the threat of global warming as a golden opportunity to resurrect their dying industry. The reason is simple: nuclear plants don't produce carbon dioxide (CO_2), the main greenhouse gas.

Politicians like French Environment Minister Brice Lalonde, a founder of Friends of the Earth, are suggesting it's time to 'revisit the nuclear option'. And Canadian Energy Minister Jake Epp believes nuclear power needs to be considered for 'environmental reasons'. Even respected research centres like the Union of Concerned Scientists and the Climate Institute have jumped onto the nuclear bandwagon.

Despite attempts to paint nuclear power green, the technology is still plagued by three unresolved issues: how to store deadly radioactive materials for thousands of years; how to prevent serious accidents (Chernobyl and Three Mile Island have not faded from the public mind); and a confident, reclusive nuclear priesthood who treat their technology as inherently safe.

These nagging worries have led to a worldwide collapse of confidence in nuclear power. There are now fewer nuclear plants being built than at any time in the history of the technology. Sweden is phasing out nuclear power altogether, the country will start closing its reactors in 1995 and finish by 2000.

New efforts to revive the industry centre on the development of a second generation of so-called 'inherently safe' reactors based on passive safety systems. Passive systems cool the reactor core without human or mechanical intervention. However as one industry newsletter, *Nucleonics Week*, comments: 'Experts are flatly unconvinced that safety has been achieved — or even substantially advanced — by the new designs.'

But suppose the nuclear industry could suddenly solve all its problems and rush a new safe reactor into production. Would an all-out nuclear construction program be enough to slow greenhouse warming?

Not likely, says the Rocky Mountain Institute (RMI), a Colorado-based think-tank specializing in energy policy. RMI researchers found that backing nuclear power was a poor alternative to investing in increased energy efficiency — improving the ways in which we already use electricity. According to the RMI study, even if a thousand-megawatt nuclear plant was built every two days for the next 40 years, overall CO_2 emissions would still increase. This is because nuclear power can only displace coal-fired electricity plants and not the bulk of CO_2 emissions which come from automobiles, factory smokestacks and home furnaces.

The researchers also looked at the costs of nuclear versus improved energy efficiency. The results? They found that every dollar invested in energy efficiency displaces nearly seven times more carbon than the same investment in nuclear power. 'To the extent that investments in nuclear power divert funds away from efficiency,' the study concluded, 'the pursuit of a nuclear response to greenhouse warming would effectively exacerbate the problem.'

Unfortunately, according to RMI Research Director Amory Lovins, politicians choose energy options based on the 'Chinese-restaurant-menu' approach — buying one option from Column A, one from Column B and so on, until all constituencies are satisfied. However, notes Lovins, 'on today's energy menu all the best choices may be in column A (efficiency) with column B (supply expansion) only a bad second best'. Since his 1976 book *Soft Energy Paths*, Lovins has been a key advocate of energy efficiency: an approach which turns conventional supply-and-demand theory on its head.

"Experts are flatly unconvinced that safety has been achieved — or even substantially advanced — by the new designs"

Lovins and other energy-efficiency supporters believe the trick is to wring the most work out of the energy we already produce. In fact, studies worldwide (including reports done for Canada's energy ministers and Britain's Association for the Conservation of Energy) confirm that energy efficiency is the simplest, cheapest and fastest way to reduce our dependence on fossil fuels.

One tiny example is the spread of high-efficiency compact fluorescent lamps. These use 60-90 per cent less electricity than incandescent bulbs, last 10-13 times longer and use half a tonne less CO_2, and eight kilograms less sulphur dioxide over five years. When a homeowner saves a kilowatt hour of electricity with an energy efficient light-bulb, it's a kilowatt hour the power company doesn't have to generate. When the saved kilowatt hours from all possible sources are added up, the need to build new coal plants or oil rigs is eliminated. In fact the savings are so great that Southern California Edison gave away over half a million of these super-efficient lights to their low-income customers because it was cheaper to do that than to operate existing power plants.

Super-efficient appliances, motors and windows are also widely available and spreading very quickly. High-performance windows combine invisible metallic coatings and inert gas between the panes to double or triple the efficiency of a conventional, double-glazed window. If these windows were installed in homes and offices, the energy equivalent of one North Sea oil deposit could be saved in Britain alone. In the US, improved standards for domestic appliances will eliminate the need to build 22 large power plants by the year 2000, according to Howard Geller of the American Council for an Energy Efficient Economy.

Energy efficiency and conservation can dramatically slow global warming, allowing us time to make a transition to a renewable energy future. That seems clear. What is less certain is whether renewed interest in the nuclear option will retard the choice. We need to make sure it doesn't — because our energy future will determine the future of our planet.

Stephen Hall is an energy consultant and a connoisseur of vegetarian restaurants.

Reprinted from the New Internationalist, April 1990

PLUTONIUM IS FOREVER

Is there any sane place to put nuclear waste?

Back in the 1950s, when nuclear energy was new, one of its few critics came up with a biting metaphor for an overlooked problem: "Nuclear waste is like getting on a plane, and in mid-air you ask the pilot, how are we going to land? He says, we don't know — but we'll figure it out by the time we get there." This sensible criticism was ignored; governments around the world were bent on pushing atomic technology for both civilian and military purposes.

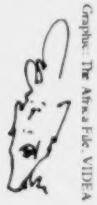
Four decades later, our nuclear plane is preparing for a crash landing. During those 40 years, nuclear power has come and gone as a boiling political issue; in the past ten years it faded from the headlines almost completely. But now, starting with small communities wrestling with nuclear waste sites and reaching all the way into international negotiations, the nuclear waste issue is back — and it's more controversial than ever before.

A recent report by Nicholas Lenssen, a researcher at the Washington-based Worldwatch Institute (**Worldwatch Paper 106**, Dec. 1991), estimates the worldwide volume of high-level nuclear waste at more than 80,000 tons; the world's 413 commercial reactors produced 9,500 tons in 1990. And that's not even counting the tens of thousands of tons from weapons programs and medical and industrial uses.

Highly toxic nuclear waste is probably the toughest garbage problem known to humanity. Lenssen writes that in 1989 alone, U.S. reactors produced about 67 times the plutonium it would take to give everyone on earth lung cancer.

Most of the world's high-level nuclear waste is spent fuel from nuclear reactors. While it's possible to "reprocess" uranium rods and use them for another fuel cycle, it takes huge amounts of energy to do so and creates additional waste; the same is true for "transmutating" the waste into something less hazardous, an experimental technology with unknown risks. If you can't recycle it and you can't transmutate it, there's only one thing left to do with nuclear waste: Store it someplace where it won't endanger people or the environment.

"Yuck! I think that the nuclear industry has down-played the nuclear waste crisis."



Graphic: The Africa Fund, VIDEA

The U.S. Department of Energy (DOE) selected Yucca Mountain, Nevada, as the national "permanent repository for nuclear waste." But after 10 years of research and more than $1 billion dollars, DOE still hasn't drilled a single hole into Yucca Mountain — mostly because of opposition from Nevadans and their state government, who have been able to show potential risks in the project. By now, DOE has pushed back its deadline for the dump from 1998 to 2010, and many believe Yucca Mountain will never open.

Meanwhile, nuclear waste keeps piling up at the country's 110 nuclear reactors, mostly in indoor water pools originally designed to hold small quantities for a few years. As the Minneapolis-St. Paul weekly **City Pages** (Jan. 29, 1992) reports, utility organizations estimate that within the next 10 years, about half of the nation's nuclear power plants will have to find another place to put their waste or shut down; as a result, power companies have begun to create their own on-site nuclear waste dumps. The preferred technology is called "dry-cask storage," which means keeping the waste in giant outdoor steel cans.

The first three dry-cask facilities — all located on the East Coast — provoked little public debate, but that changed when Minnesota's Northern States Power Company (NSP) announced that it wanted to put dry casks right next to the Prairie Island Mdewakanton Sioux community, a small reservation near the scenic Mississippi River bluffs 40 miles south of St. Paul. The Prairie Island community, which had long felt nervous about the neighboring nuclear plant, mounted a high-profile legal and political fight, and as of this writing the Indian tribe has convinced a state administrative law judge to issue a recommendation against the dump.

Even if dozens of reactors put up dry casks, however, DOE will still have to wrestle with finding a long-term dump; after all, the federal government decades ago promised utilities that it would start taking their waste by 1998. The deadline looms even larger considering that — as Bill Breen reports in the environmental bimonthly **Garbage** (March/April 1992) — at least 67 of the nation's current 110 nuclear plants will have to close and be dismantled within the next 30 years, adding uncounted tons of radioactive debris to the nuclear waste stream. The Bush administration is trying to

avoid the problem by proposing that most reactors get "relicensed" for another 30 years beyond their original lifespan, but that idea carries its own set of safety and environmental problems.

So, since a safe, permanent nuclear waste site looks ever more unlikely, DOE has revived a concept Congress told it to forget at least until Yucca Mountain was built: monitored retrievable storage sites, or MRS sites. As Tony Davis puts it in the Rocky Mountain regional paper **High Country News** (Jan. 27,.1992), spent reactor fuel would be shipped in and stored in above-ground bunkers at the regional MRS sites until a permanent dump is ready.

When it started looking for an MRS host community, DOE sent out a "nuclear waste negotiator" with a package of promises considered irresistible to many impoverished rural communities. Communities willing to consider the waste dump were promised "500 to 1,000 jobs that pay salaries of up to $45,000 [and] additional payments of $5 million to $10 million a year," Davis reports.

By early this year, seven communities had applied for a $100,000 MRS "study grant" — two were rural counties in North Dakota and Wyoming; the other five were Native American tribes. Mordecai Specktor reports in the Minneapolis-St. Paul-based Indian monthly **The Circle** (Feb. 1992) that there's some evidence that DOE specifically targeted tribes, in part because of their sovereign status — which means state governments often can't interfere with the project — and in part because of their desperate economic straits.

In each community, announcements that local officials were considering the MRS proposal inevitably set off a firestorm. In Grant County, North Dakota, voters threw out a majority of the county commissioners who had voted for the MRS study. New Mexico's Mescalero Apache tribe, meanwhile, seems to be the farthest along the MRS road, though tribal chairman Wendell Chino says he would place the dump on off-reservation land that would be acquired and then declared tribal property.

Wherever MRS sites eventually go, if there are any at all, plenty of questions remain about environmental and health effects. At Prairie Island, the tribe discovered that NSP's 48 dry casks (peanuts compared to the thousands envisioned for a regular MRS site) would emit radiation between 6 and 23 times higher than levels set by the state safety guidelines. The information won't do them much good, however, since the federal government has reserved authority to regulate all things nuclear, and therefore state guidelines don't apply.

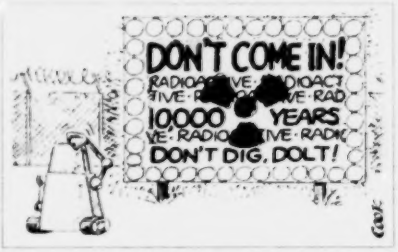
In the meantime, a growing number of people support "intermediate storage" for 50 or 100 years or however long it takes to find another disposal method. Intermediate storage could mean "moth-balling" waste and the decommissioned plants on site, thus avoiding risky dismantling and transportation. (the British government plans to mothball dead reactors for at least 130 years).

This method of dealing with the problem would force governments, power companies, and the public to face up to just how daunting a dilemma nuclear waste has become. And then, it might be hard to escape the next logical conclusion: If we got ourselves into this mess, at least let's stop producing any more. There is, of course, always the alternative of keeping on at the rate we're going now — which means, notes the Worldwatch Institute, that we'll have to open at least one nuclear waste dump every two years for decades to come.

Monika Bauerlein

Reprinted from the Utne Reader, July/August 1992

Robot miners pose health risk



Will inhabitants of the Earth in the year 12,000 be able to read a "Keep Out" sign? This is the question being posed to a panel of 16 specialists — physicists, sociologists and self-proclaimed futurists — who are part of the performance assessment group for the Waste Isolation Pilot Plant (WIPP), a vast nuclear waste repository being constructed by the US Department of Energy in underground salt beds near Carlsbad, New Mexico.

The US Environmental Protection Agency requires any nuclear waste disposal site to be protected from intrusion for the next ten millenia. Potential future intruders have to be warned by some type of permanent marker on each repository. The panel is trying to imagine the ways in which a future society might mine or disturb the salt beds that encapsulate the WIPP repositories.

Gregory Benford, physicist, science fiction author and panel member, is concerned that the conventional warning markers might fail to attract the attention of robot miners. Benford proposes burying a fence of sonic or magnetic markers that would keep most advanced machinery — like robots — from damaging the repository and releasing large amounts of radioactive material into the water table and atmosphere.

Reprinted from Alternatives, Vol. 18, No.1, 1991

OCEANS IN CRISIS

Scientists have known for some time that oceans interact with the atmosphere and contribute to the making and shaping of the world's climate. Oceans constitute a source of energy, minerals and medicines that is growing in importance as technology progresses and land resources become scarce. Coastal waters and the continental shelf are also vital sources of food, yielding over 90 per cent of the world's fish catch.

Yet, seas have also become the planet's ultimate waste dump, as every year billions of metric tonnes of silt, sewage, industrial waste, chemical compounds and pollutants dissolved in runoff pour into the world's oceans. In fact, most of the wastes and contaminants produced by human activities eventually reach the sea. While some pollutants are highly visible, such as oil spills, others are highly dangerous. Traces of DDT have been found in remote parts of the Antarctic; plutonium has been discovered on the eastern and western coasts of the United States. High levels of PCBs, DDT, mercury, cadmium and other chemicals are blamed for the collapse of the beluga whale population in the St. Lawrence River. Is it because the oceans are part of the world's global commons, exploited by many countries and the responsibility of none, that they are so difficult to protect?

Are the oceans irreversibly polluted?

In early 1990, a group of scientists — called the Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP) — convened by the United Nations, investigated this question. They determined that "chemical contamination and litter can be observed from the poles to the tropics and from beaches to abyssal depths," but that the distribution of pollutants was uneven. The GESAMP scientists concluded with a warning that marine pollution is worsening and a call for action. "We fear, especially in view of the continuing growth of human populations, that the marine environment could deteriorate significantly in the next decade unless strong, coordinated national and international action is taken now."

COASTAL ZONES IN DANGER

The coastal zone is where land, sea and atmosphere interact, and has one of the highest biological productivity levels on earth. It supports marine life ranging from plankton to fish and whales. Coastal areas are also home to more than half of the world's population, which depends on its resources and largely influence its state of health. Their strategic and commercial importance is such that two-thirds of the world's largest cities are near tidal estuaries. Close to 90 per cent of the marine fish harvest is caught within 200 miles of the shore. The 240,000 square kilometres of coastal mangrove forests are essential habitats for many economically important fish species. And, of course, coastal zones support a highly modern and profitable tourist industry.

Despite all those advantages, the ecosystems and resources of the coastal zone are rapidly deteriorating due to intense and increasing human pressures. According to GESAMP scientists, most of the world's coastal areas are seriously polluted. Yet, corrective actions can make a significant difference. The decrease in DDT concentrations in fish and shellfish in the U.S. and Sweden confirms that changes are possible. However, efforts to control marine pollution are presently thwarted by serious constraints, including weak public support, inadequate funding, lack of trained personnel and equipment, and a reluctance in many countries to confront powerful economic interests.

Most marine pollution reaches the oceans from a variety of land-based sources. In terms of importance, sewage is a prime polluter. A 1987 study by the United Nations Environment Programme found that most of its Ten Regional Seas Programme, covering the majority of the world's marine regions, identified microbial contamination of the oceans as the subject of highest concern.

Chemical pollutants constitute another assault on marine environment. These chemicals come from a variety of sources — industries, airborne pollutants, shipping accidents, pesticide runoff, mine tailings and waste incineration. Each year, the rivers and streams entering the oceans carry some 20 billion tonnes of suspended matter and dissolved salts, including heavy metals and organic compounds. Even at low levels, these pollutants are known to be harmful to marine wildlife. Moving through the food chain, they constitute a serious threat to human health.

The wreck of the supertanker Exxon Valdez in Alaska's Prince William Sound on March 24th, 1989, was the most dramatic ocean disaster in recent memory. The spill created an environmental calamity that will linger for decades. Although oil spills get media attention, far more oil silently finds its way into the oceans via street runoff, ships flushing their tanks, and effluent from industrial facilities. A 1985 National Research Council report found that 21 million barrels of oil annually enters the seas this way.

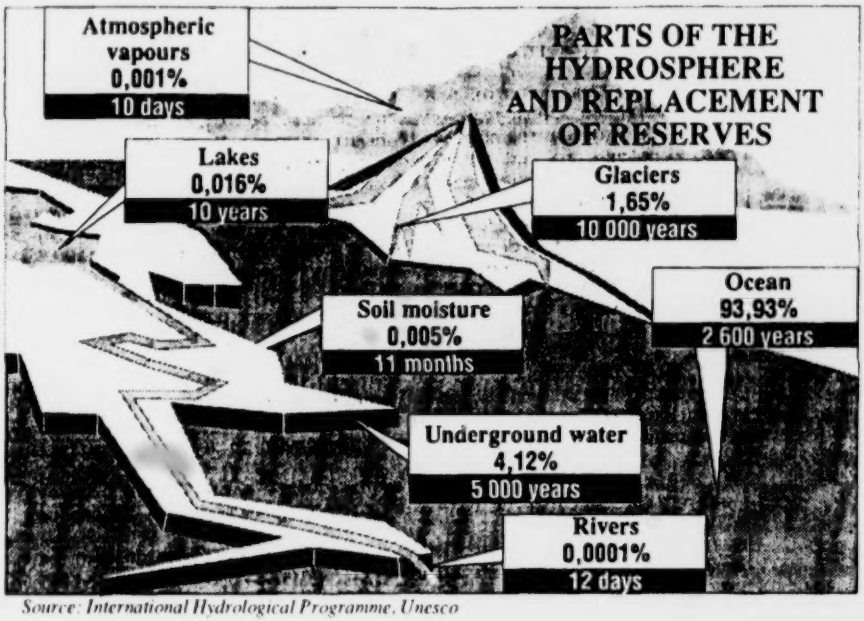
Reprinted from Development, Spring 1992

WATER: RESOURCES AND CONSUMPTION

The above diagram presents the composition of the "hydrosphere", i.e. the sum total of the planet's liquids, as well as the duration required for each of these elements to entirely replenish itself.

The total volume of water on the Earth is 1,454 million cubic metres (km³). This is the equivalent of a layer of water some 2,650 metres deep covering the entire planet.

The oceans form 94% of this volume, followed by underground water (4.1%) and glaciers (1.65%). Then, in much weaker proportions, comes lakes (0.016%), soil moisture (0.005%), atmospheric vapour (0.001%) and finally rivers (0.0001%), which make up only one millionth of the hydrosphere but represent the main source of potable water accessible to humanity.


PARTS OF THE HYDROSPHERE AND REPLACEMENT OF RESERVES
Atmospheric vapours 0,001% 10 days
Lakes 0,016% 10 years
Glaciers 1,65% 10 000 years
Ocean 93,93% 2 600 years
Soil moisture 0,005% 11 months
Underground water 4,12% 5 000 years
Rivers 0,0001% 12 days

Source: International Hydrological Programme, Unesco

However, through the "hydrological cycle" water continues to circulate between the different elements of the hydrosphere. The diagram also shows how long it takes for each of these elements of the hydrosphere. The diagram also shows how long it takes for each of these elements to replace itself; in the case of rivers, for example, the process takes 12 days. Consequently, if at a precise moment, all the planet's rivers contained 1,200 km³ of water, the total flow over a year would reach roughly 37,000 km³.

However, it should be added that this total quantity is not entirely accessible for human use. Given that water courses must maintain a minimum rate of flow (for navigation, fishing and other human activities), and that a number of them are unexploitable, we can only bank on about 13,000 km³ being available each year — or, in other words, one-one hundred thousandth of the total hydrosphere.

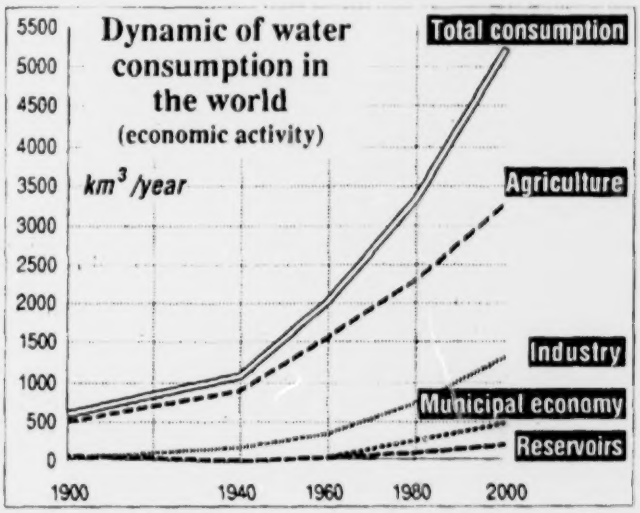
N.B. All of the figures shown on these two pages are approximations, given that the hydrologists themselves differ slightly on the numbers.

Consumption increased tenfold in one century

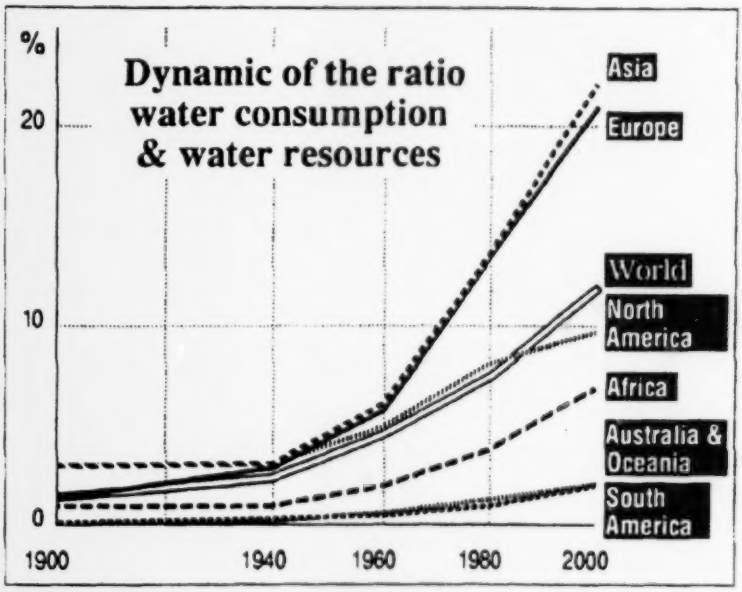
This graph shows the evolution of world water consumption from 1900 to the year 2000. Globally, consumption has increased ten-fold in one century, and, by the year 2000 almost half of the available water supplies will be in use.

Agriculture, and particularly irrigation, remains the thirstiest consumer despite a continuing fall in the amount of water it uses, which will have dropped from a high of 90.5% of available supplies in 1900 to 62.6% in 2000.

During the same period, the portion used by industry will have passed from 6.4% to 24.7%, with cities sharing the same rate of growth, climbing from 2.8% in 1900 to 8.5% in 2000.



Source : Investigations of land water resources : results, problems and prospects. A. Shiklomanov, Leningrad, 1988.



Source : Investigations of land water resources : results, problems and prospects. A. Shiklomanov, Leningrad, 1988.

Unequally Exploited Resources

Still looking across the 20th century, how has water consumption compared to the available resources in each of the world's major regions? This graph answers the question with the help of percentages calculated on the basis of theoretical resources — i.e. the amount of water flow in rivers.

According to these calculations, Europe and Asia are clearly much greedier that North America, Africa, and more particularly, South America and Australia-Oceania. It is also clear that Europe and Asia have the highest growth in consumption, except for South America, where the increase is offset by plentiful reserves of water.

Reprinted from UNESCO Sources, March 1990

Quality water lifeblood of environment

What's in a glass, a sink, a river full of water? ... A refreshing drink ... a cleansing wash... an invigorating swim ... a home for plants, insects, fish, birds and mammals. It all depends on the water quality.

We tend to think of water in terms of a particular purpose: is the quality of the water good enough for the use we want to make of it?

Water fit for one use may be unfit for another. We may, for instance, trust the quality of lake water enough to swim in it, but not enough to drink it.

Drinking water, for example, is regulated by guidelines stringent enough to protect human health. Lack of such guidelines can lead to a variety of health problems.

It has been estimated, for example, that contaminated water and poor sanitation cause 30,000 deaths around the world daily — the equivalent of 100 jumbo jets crashing every day!

Water is the lifeblood of the environment, essential to the survival of all living things — plant, animal and human — and we must do everything possible to maintain its quality for today and the future

Did you know?

- About 70 per cent of the human body is water.
- Life on earth probably originated in water.
- More than half of the world's animal and plant species live in water.
- Almost 75 per cent of the earth is covered in water.
- The human body needs two litres of water a day in our climate; we can last only a few days without water.
- Most of our food is water: tomatoes (95%), spinach (91%), milk (90%), apples (85%), potatoes (80%), beef (61%).
- Canadians use an average of 350 litres of water daily for household and gardening purposes (somewhat less during the fall to spring seasons and much more during the summer months).
- A mere five per cent of our home water supply is used for drinking and cooking.
- About 75 per cent of indoor home water use occurs in our bathrooms. Toilets are the single greatest indoor water user.
- Indoor water use peaks twice a day year-round, in the mornings and evenings.
- The biggest peaks during the year occur in the summer, when about half to three quarters of all-municipally treated water is sprayed onto lawns.

Source: Environment Canada

Reprinted from the Times Colonist, May 31, 1992

A Swelling Problem of Waste Disposal

Another form of degradation, often unaccounted for, is the poisoning of land by toxic waste. Roughly 300 to 400 million tonnes of hazardous wastes are generated each year by industrial activity of which ends up in landfills. In addition, an estimated 70,000 to 80,000 chemicals are currently on the market and in the environment; up to 2,000 new chemicals are added each year, many without adequate prior testing of their effects.

"I think it's time to start thinking about the 3Rs — Reduce, Re-use and Recycle."

Graphic: The Africa File, VIDEA

Industrialized countries generate by far the largest amounts of toxic and hazardous wastes. But developing countries are steadily increasing their share. In fact, scarcely a country on earth has been spared the scourge. From toxic waste dumps in the U.S. to the waste-choked sewage of Calcutta, to the industrial landfills of Germany, and the illegal toxic dump sites in Latin Amercian and African countries, the littering goes on relentlessly.

Most countries still rely on land disposal methods for their hazardous wastes. In the U.S., 80 per cent of solid waste is now dumped into 6,000 landfills. This number is shrinking fast: in the past five years, 3,000 dumps have been closed; by 1993 some 2,000 more will be filled and shut. In addition, many waste disposal sites are environmental time bombs that need remedial action. Several cases of groundwater contamination by chemicals leaking from unsafe landfills have already been reported. The cost of the clean-up is awesome: $1.5 billion for the Netherlands; $10 billion for West Germany; and $20-$100 billion for the United States. Other careless dumping has exposed people directly to hazardous chemicals. At Love Canal, near Niagara Falls, homes were built on a former dump containing pesticides, chemicals and sludge.

A growing mess?

The voyage of the "Pelicano" that sailed around the world for two years, seeking a port that would accept its cargo of 14,000 tonnes of toxic ash is a stark symbol of what waste problems have become. And future trends provide no relief in sight. The likely scenario for the next 40 years? Developing countries will be responsible for more than 90 per cent of the world's new population. This alone will increasingly shift the responsibility for global waste generation toward poorer countries. Since most of them are ill-equiped to confront this massive problem, say experts, further trashing can be expected.

Reprinted from Development, Spring 1992

Banning the export of hazardous waste

By its nature, it is difficult to dispose of toxic and hazardous waste, since it pollutes whatever environment — air, soil or water — it enters. Waste also travels. An unknown amount has found its way to developing countries and Eastern Europe.

Among the revelations in East Germany after the collapse of hard-line communism was the country's role as a garbage dump for its neighbor countries. The Third World is even more ill-equipped than Eastern European countries to deal with toxic waste. Few developing countries have established the basic foundation of a hazardous waste management system. Most have no regulations, nor trained manpower, and no facilities capable of treating and disposing of hazardous wastes. Yet, over the years, a disturbing trend has emerged: developed-country industries have resorted to exporting hazardous waste for disposal in Third World countries. The extent of the problem is more massive than previously thought. A study by Greenpeace lists 115 shipments of toxic waste during 1986-88 that were sent to Latin American and African countries. In some cases, the dumping was the result of legal contracts by Third World companies or governments accepting waste in exchange for hard cash. In other instances, hazardous wastes have been dumped illegally. Hazardous waste dumping in some African countries has raised widespread concern.

Recently, countries have taken action to halt the indiscriminate dumping of hazardous wastes. A global convention was signed in Basle, Switzerland in March 1989, by over 30 countries to ban waste exports to countries that lack the legal, technical and administrative capacity to handle them. This agreement does not mean an end to the commerce of toxic waste. But it has signalled the international will to better control the menace hazardous wastes pose to the welfare of our environment and to the health of all the world's peoples.

Reprinted from Development, Spring, 1992

Let them eat pollution

LAWRENCE SUMMERS, chief economist of the World Bank, sent a memorandum to some colleagues on December 12th. The Economist has a copy. Some of the memo has caused a fuss within the Bank:

Just between you and me, shouldn't the World Bank be encouraging more migration of the dirty industries to the LDCs [Less Developed Countries]? I can think of three reasons:

(1) The measurement of the costs of health-impairing pollution depends on the forgone earnings from increased morbidity and mortality. From this point of view a given amount of health-impairing pollution should be done in the country with the lowest cost, which will be the country with the lowest wages. I think the economic logic behind dumping a load of toxic waste in the lowest-wage country is impeccable and we should face up to that.

(2) The costs of pollution are likely to be non-linear as the initial increments of pollution probably have very low cost. I've always thought that *under*-populated countries in Africa are vastly under-polluted; their air quality is probably vastly inefficiently low [sic] compared to Los Angeles or Mexico City. Only the lamentable facts that so much pollution is generated by non-tradable industries (transport, electrical generation) and that the unit transport costs of solid waste are so high prevent world-welfare-enhancing trade in air pollution and waste.

(3) The demand for a clean environment for aesthetic and health reasons is likely to have very high income-elasticity. The concern over an agent that causes a one-in-a-million change in the odds of prostate cancer is obviously going to be much higher in a country where people survive to get prostate cancer than in a country where under-5 mortality is 200 per thousand. Also, much of the concern over industrial atmospheric discharge is about visibility-impairing particulates. These discharges may have very little direct health impact. Clearly trade in goods that embody aesthetic pollution concerns could be welfare-enhancing. While production is mobile the consumption of pretty air is a non-tradable.

"Money Talks!"

The problem with the arguments against all of these proposals for more pollution in LDCs (intrinsic rights to certain goods, moral reasons, social concerns, lack of adequate markets, etc) could be turned around and used more or less effectively against every Bank proposal for liberalisation.

The language is crass, even for an internal memo. But look at it another way: Mr Summers is asking questions that the World Bank would rather ignore — and, on the economics, his points are hard to answer. The Bank should make this debate public.

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Trouble in Paradise

HAZARDOUS WASTE TRADERS ARE FACING increasing difficult finding acquiescent governments to accept their refuse. With waste disposal costs in industrial countries rising and many West African countries prohibiting waste imports, the traders are shifting their attention to the South Pacific.

Bunny McDiamid of Greenpeace New Zealand says there have been between 15 and 20 serious proposals for waste disposal projects submitted to South Pacific governments in the last few years.

Typical of the situation faced by South Pacific governments is the case of Tonga, a tiny nation located south of the Samoan Islands which has a population of 108,000. Tonga's only exports are bananas and coconut products. Electricity for its residents comes from generators powered by increasingly expensive diesel fuel. Its economic situation is compelling it to consider a proposal from RDI Energy Technologies, a Seattle, Washington-based company. RDI proposes sending 30 million used tires over a five-year period to Tonga, which would burn the tires in a power-generating incinerator. This plan would not only expose Tongans to chemicals emitted by the burning tires, it would also exacerbate the "greenhouse effect" by releasing carbon dioxide into the atmosphere. According to scientists at Environment magazine, the sea level rise which will accompany global warming would almost certainly flood many of the 169 coral and volcanic islands which comprise the nation of Tonga.

Reprinted with permission from *Multinational Monitor* [May 1991], PO Box 19405, Washington, DC 20036. Individual subscription $25/yr.

Economic boost — or environmental folly?

To end the periodic flooding of the Yangtze and to further its ambitious industrialisation programme China is going ahead with the world's largest dam. Environmentalists warn that the scheme — which will displace more than a million people — will be an environmental disaster.

Despite national and international protests from scientists and environmentalists, China has started resettling some of the 1.1 million people who will have to move to make way for the world's largest dam.

The Ministry of Water Resources and Electric power says that the US$10.7 billion Three Gorges project will stop the age-old flooding of the Yangtze river, provide energy-short industries with 17,680 MW of electricity and greatly improve navigation along the river. Opponents consider it environmental folly.

Domestic opposition — mainly scientists, academics and officials of the ministries of communication, environment, education and culture — was most vocal in the period leading up to the 1989 Tiananmen Square pro-democracy demonstrations. They got the government to put the project on hold by arguing that the government could not afford it, lacked the technical expertise to run it, and that the social and environmental impact would be immensely destructive. But, bolstered by the crushing of the students' movement and Yangtze river flooding that killed 3,000 people and caused millions of dollars worth of damage, the government felt confident enough to begin resettlement.

The plan is to build a 185 metre high dam and a 39.3 billion cubic metre reservoir, involving the installation of 26 generators, each with a capacity of 680 million kW. It will take 20 years to construct.

The Yangtze Valley has been the site of some of the worst natural disasters in China's history. Between 1860 and 1960 five major floods in the low-lying plains of the Yangtze basin killed tens of thousands of people. The 1954 flood claimed 30,000 lives and cut off Wuhan City, capital of Hubei Province, for 45 days. The feasibility report for the Three Gorges project says the dam can prevent such killer floods.

Opponents accuse the dam's supporters of misusing the flooding argument to gain public support. The dam will be located upstream of the narrow zigzag section of the Yangtze most vulnerable to flooding, and they argue that its flood control value would be limited to checking only one of the river's many tributaries. Moreover, the opponents argue that the river's heavy silt load would rapidly reduce the reservoir's storage capacity.

The potentially huge electricity output provides the second justification for the dam. Demand in central and east China and eastern Sichuan is expected to increase from 20,600 MW in 1985 to 70,000 MW by the year 2000 and to over 120,000 MW by 2010.

Vaclav Smil, professor of geography at the University of Manitoba in Canada, points out that the current amount of electricity produced per head of population in the regions around the Three Gorges is only one-fifth of the figure for Brazil or Mexico, and barely 1% of average per capita energy consumption in Canada or the United States.

The proposed power-generating capacity of 17,680 MW will turn out 84 billion kilowatt hours annually, which the feasibility report says is equivalent to burning 40 million tonnes of coal. This would greatly alleviate the country's ash disposal problem, and would reduce carbon dioxide and sulphur dioxide emissions into the atmosphere by 4.5 million tonnes a year. Moreover, it would solve the perennial problem of railway bottlenecks as coal is transported from the north to the south. Dam supporters also argue that hydroelectricity is much cheaper than nuclear energy.

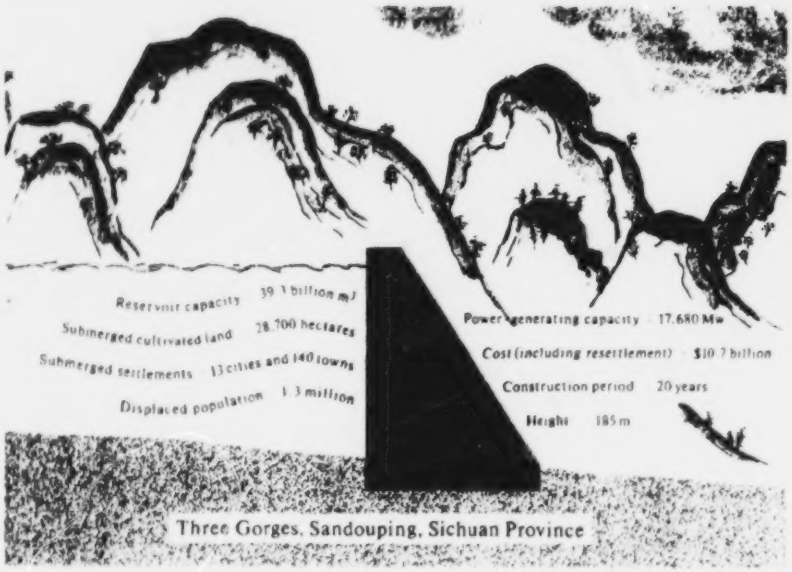
The dam-busters retort that China's energy shortage stems from a bias towards heavy industry combined with inefficiency encouraged by artificially low energy prices, and that tackling these issues would be more beneficial than building large and environmentally dangerous power plants.

Heavy industries, such as iron and steel manufacturing and chemical processing, consume about 65% of the country's electricity supply. In 1987, the steel industry consumed roughly twice as much electricity to produce one tonne of steel than Western and Japanese producers. A study by researcher and ecologist He Bochuan showed that China consumes seven times more energy than Japan to produce one unit of gross national product. But the low electricity prices give little incentive to industries to adopt energy-saving technology. By providing cheap electricity, the dam would only perpetuate existing wasteful practices, the critics argue.

They suggest that instead of one gigantic dam, a series of small-scale hydro-projects should be built on the upper, less densely populated reaches of the Yangtze's tributaries. They argue that such an approach would cost less and take less time to construct.

The anti-dam groups are also concerned with the social and environmental implications of building the dam. Flooding the Three Gorges area would uproot 1.1 million people and submerge 28,700 hectares of cultivated land. The reservoir would inundate 13 cities, 140 towns and 800 villages, and drown several historical and archaeological sites. The greatest loss would be the beautiful Three Gorges itself, one of China's most celebrated national sites, which has inspired artists, poets and writers for generations and is a popular tourist attraction.

Although the feasibility report recommends moving people up the valley slope where they could raise animals, grow


Reservoir capacity 39.3 billion m³
Submerged cultivated land 28,700 hectares
Submerged settlements 13 cities and 140 towns
Displaced population 1.3 million
Power generating capacity 17,680 MW
Cost (including resettlement) $10.7 billion
Construction period 20 years
Height 185 m
Three Gorges, Sandouping, Sichuan Province

oranges or establish workshops, some scientists at China's Academy of Sciences have pointed out that the area is already densely populated and heavily deforested and that the resettlement of such large numbers would create environmental disaster.

Nor do critics believe that the problem of soil erosion in the upper Yangtze Valley has been adequately addressed. Vegetation coverage fell from 50% in the 1950s to 10% in the 1980s as a result of wide-scale land reclamation and deforestation. The loss of vegetation led to soil erosion, which critics assert is the reason for the large and increasing silt content of the Yangtze. Silt carried into the river in Sichuan Province is estimated to have increased from 510 million tonnes in the 1970s to 680 million tonnes in the early 1980s. At that rate of siltation, some scientists fear that the Three Gorges will repeat the experience of the Sanmen Gorge project on the Yellow River which could not operate to expected capacity because sediment had half-filled the reservoir after only seven years.

Other ecological and environmental concerns include the possible extinction of endangered wildlife such as the Yangtze River dolphin, the Chinese sturgeon, the finless porpoise and the Yangtze alligator. The dam would also have a negative impact on downstream lakes and wetlands, which support fisheries and provide habitat for endangered Asian waterfowl like the Siberian crane. It could lead to an increase in landslides and earthquakes, and unforeseen general ecological changes in the Yangtze River Valley, the heartland of China's agriculture and industry, which is inhabited by one-third of China's population and produces 40% of the nation's grain and industrial output.

Mo Li is a freelance Chinese journalist living in Canada.

Reprinted from Panoscope Magazine, March 1992

Armada against Narmada

India's Narmada dam project is the most grotesque example of World Bank monomania. But women like ***Medha Patkar*** *are helping to build a formidable wall of human opposition.*

FOR the last seven years a fight has been going on in the Narmada valley and it is now quite clear that the valley is being led towards destruction — not just of its environment but also of its human communities.

This particular valley, which has bountiful forest and water resources, has been the life support system for the tribal communities who live there for generations. Now it has become the focus of attention for those who want to exploit these resources in the name of development.

For them, development means meeting demand. And demand comes from those who have the purchasing power and the political power to express it. If water in the Narmada region is to be harnessed to hydropower then this is justified on the basis of the demand for energy. But who ultimately is going to benefit from hydropower? This question is never frankly and promptly answered. No-one is encouraged to ask it. The whole atmosphere, in developing countries also, is dominated by the Western-oriented development pattern and the interests of elites — bureaucrats, politicians, contractors and their like.

We realized the first thing to be done was to establish the rights of the directly affected people. These include the tribal people belonging to highly-integrated, non-consumerist communities living right up in the mountain ranges, with no roads, no shop, no school, no post office, no whatever you call an indicator of modern development.

Nonetheless they are rich in other ways. They are integrated. They know how to manage their lives with happiness and within the available resources. And they also have a more or less sustainable way of handling natural capital resources. They have three 'lenders' at their disposal: the land, the forest and the river. Unlike the World Bank, these natural 'banks' come to their help when they need them, in one season one, in another season another.

The communities in the plains are heterogeneous, not homogeneous like the tribal peoples, but they are culturally established, full of not just tourist sights and monuments but a culture which revolves around the natural resources in the valley.

But the Government claimed the project was 'public purpose' and used the age-old Land Acquisition Act. The Act is irrelevant to this kind of large-scale displacement, large-scale social and environmental impact, which involves not just individuals but communities, civilizations within civilizations.

The tribal people said: 'Land is not created by you; land is created by God. It has been in our hands for generations. So today if you come to plunder what is capital not just for us but for generations to come we can't easily allow you to do that. If you come as intermediaries from the Almighty, kindly get a certificate from Him! Tell us what you want, bargain for it, and then we will have our own doubts.'

> "Land is not created by you; land is created by God. It has been in our hands for generations."

Now, there are no answers to these kinds of questions — even simple, logical, practical questions like: 'How could you start building the dam before even coming to ask us? How can you expect us to sacrifice everything that supports our way of life and our livelihood?' The whole framework of 'public purpose' projects and land acquisition was questioned.

The World Bank always sends the first reconnaissance mission to projects of this kind, so it gets legitimacy and credibility. No-one ever questions the details of the data used by the World Bank. In the case of Sardar Sarovar (Narmada) projects, four pages of risk analysis showed that the economic rate of return might come to zero, and so it has proved in practice. But the World Bank has no wish to face up to the consequences. The project becomes irreversible.

Development officials are cautious and like to boast of 'involvement' and 'participation'. But their words are empty. They create new structures and in the process invariably end up destroying or by-passing indigenous structures and values. Take the Social Forestry Programme of India, for example. The initial programme as proposed by the UN's Food and Agricultural Organization (FAO) promised that the forests would meet the needs of the community, who would partici-

pate in forestry. Nothing like that has happened. The communities have become the daily wage earners for forester teams who are out to exploit tribal people. They do not have to worry about protests because once a project is funded, once it's supported from outside, local support doesn't matter.

We're not saying that you can't interact with us. But you must interact with the community, with a full understanding of our rights, which have come to us through generations. You cannot come to us in the form of a collector,an administrator, a politician or whosoever and bestow upon us the rights and titles to our own land.

For if people accept this kind of thing they also will not mind destroying their own natural resources. Suppose a woman is cooking and she wants firewood for the stove to cook bread. Now, tribal houses are very spacious, full of wood, with wooden pillars, and each type of wooden pillar has a separate name. The woman who starts hunting for wood never touches the pillar by the hearth. She goes out and takes wood from the forest, which she does not think of as hers but the Government's. So she is not concerned for its future. There is no meaning in saying: 'But look! They had the forest and they destroyed it!' Technically speaking, in modern property terms, they never had it in the first place.

These matters have a twofold importance for aboriginal and indigenous peoples anywhere in the world. First because they are the ones facing the direct backlash of the development model. Second, they are not just preserving their own land, but demonstrating how a people-nature relationship, a human-human relationship which can be non-exploitative, is the basis of their life.

The real challenge of 'modernity' faces everyone. That challenge is not to fulfil a particular person's desires, or those of a small number of people. That is easy. The real challenge is not to have a water source in just one place because you can't find a way to tap it in the thousand different places that are needed. The real challenge is not to fund a single project costing hundreds of millions of dollars, but to develop participation as the focus at 500 or 500,000 different points. That is the challenge that needs to be faced if truly modern institutions are to be created. Otherwise you are the traditional ones — you are more traditional than we are.

There must be roots among the people. You cannot call these 'grass roots'. Grass roots are very superficial, you know. This kind of jargon is rhetorical and has no meaning for most people. I know European activists who have 'grass roots' all over the place which entitle them to participate in 20 different seminars. If you 'participate' by going from seminar to seminar, conference to conference, you cannot achieve anything. There is a kind of development agency network that is still clinging to islands of 'grass roots'.

That does not mean there should not be a support network. But what we really need is people to go out and reach the larger masses. Without that, you can talk of saving this or that but it has no meaning. You have to live the life of the people involved. When a dam is being constructed you have to be ready to face the rising water with them. Only if you can develop that faith in the communities do you have any moral right to say 'sacrifice your lives to save the valleys and the hills and the communities who live in them'.

"I know European activists who have 'grass roots' all over the place which entitle them to participate in 20 different seminars. If you 'participate' by going from seminar to seminar, conference to conference, you cannot achieve anything."

Of course, if you are attacking powerful institutions you have to learn their terminology and dissect their methodology. But it is the voice of aboriginal peoples, with their questions which can't be answered, and reaching out to others as well, that really matters. And one of them once said to me: 'We should not have anything to do with paper. Otherwise we lose.'

Medha Patkar is a member of the Narmada Bachao Andolan, the opposition campaign to the Narmada Dam project. She has been on hunger strike and was arrested shortly before leaving India to receive a 1991 Right Livelihood Award (the 'Alternative Nobel Prize') on behalf of the campaign.

Reprinted from New Internationalist, April 1992

DROWNING the Wilderness

The Quebec government is forging ahead with the mammoth second phase of the James Bay Power project, the world's largest planned hydroelectric complex, without public hearings, without a thorough environmental review, and in violation of a 1975 land claims treaty with the Inuit and Cree people of northwestern Quebec.

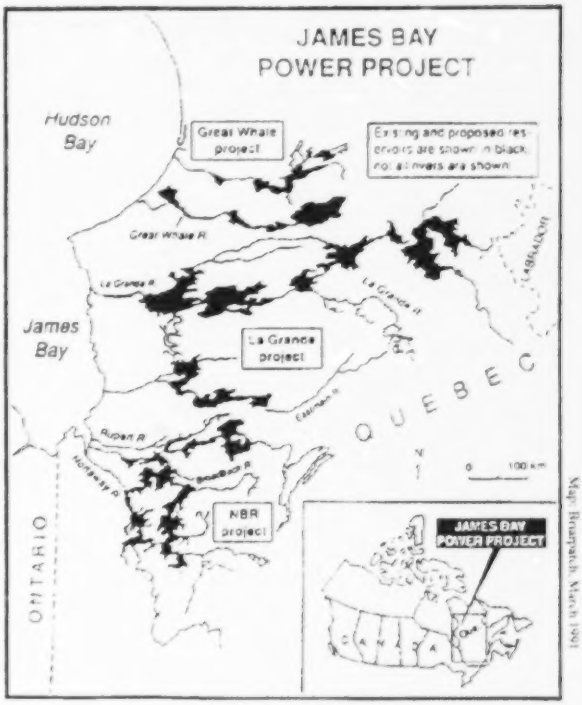
Described by Quebec's premier Robert Bourassa as "the project of the century," the scheme calls for the damming or diversion of nine rivers flowing through 350,000 kilometres of northwestern Quebec into James and Hudson Bays. If completed, Phase One and Two combined would have a staggering hydroelectric capacity of 27,000 megawatts (MW), dwarfing Brazil's 12,600 MW Itaipu Dam and the proposed 16,750 MW Three Gorges Dam in China.

Phase One, known as La Grande (10,282 MW), was constructed by the state-owned utility, Hydro-Quebec, along with other giant engineering firms such as Lavalin Inc. and Bechtel Canada Inc. In1985, the megaproject was completed without an environmental review.

"It's hard to believe that such a huge project is going ahead without an environmental assessment here in Canada."

Graphic: The Africa Fund, UNDEA

To date, four rivers have been diverted, and nine dams and five reservoirs have been built, flooding over 13,000 square kilometres of Cree territory. Several communities have been uprooted and, in 1984, 10,000 caribou drowned when water was released from one of La Grande's reservoirs. The reservoirs have submerged huge tracts of forest and released mercury from the bedrock, causing methyl mercury contamination of fish and fish-eating wildlife upon which the Cree and Inuit depend for food and income.



"Hydroelectric development is flooding the land, destroying wildlife and killing my people," says Grand Chief Matthew Coon come, leader of the Crees of Quebec.

The Inuit and Cree learned of Hydro-Quebec's plans nearly two decades ago. Without secure land title they fought a losing battle with Hydro-Quebec against La Grande and, in 1975, they reluctantly signed the James Bay and Northern Agreement with the federal and provincial governments, Hydro-Quebec and several other state-owned corporations. They were granted a small area of their rightful territory and $225 million over a period of twenty years which has helped to pay for housing and other basic services. The communities are also exploring ways to broaden their economic base by investing in road and air transport, commercial fisheries and local enterprises. Today, a younger generation of Cree, highly disturbed by the ecological impacts of La Grande, are more determined than ever to save their land and rivers from Phase Two, not just for their own cultural survival and social well-being, but for future generations.

Phase Two, including the Great Whale Development (3,080 MW), which is scheduled to be built by 2001, followed by the Nottaway Broadback Rupert Development (8,400 MW), would mean the damming of every river on the Quebec side of James and Hudson Bays, and the flooding of over 10,000 square kilometres. To do this, Hydro-Quebec plans to spend $40 billion over the next ten years and is expected to raise more than half of this in the United States, France, Germany, and Japan.

Operation of the dams to respond to electricity demand involves the total diversion of rivers and the reversal of seasonal patterns of flow. The increased flow of freshwater into James Bay, dur-

ing the six month season of ice cover on the bay, has the potential to disrupt coastal ecosystems including some of the most productive seagrass beds in the northern hemisphere which are critical for migratory water-fowl. The high and rapidly varying winter flows would threaten the survival of fish populations in the estuaries of the rivers. Beluga whales and marine and freshwater seals could also be affected.

The Inuit living on the Belcher Islands in Hudson Bay, who travel on the sea ice to hunt and fish, were not included in the James Bay agreement. They write: "As Island people, the majority of our foods come from Hudson Bay and we need these foods to survive. If Hydro-Quebec goes ahead it could cause sickness to those people living on sea life. What will happen to the large families that can't afford to buy food, if the food from the sea can no longer be eaten?"

Premier Robert Bourassa of Quebec, the chief proponent of the James Bay Power Project, views the project as the key to the province's economic self-reliance. Over the years, Hydro-Quebec has built dams for power exports to the United States and to provide cheap electricity to Quebec's aluminum and metal refining industries. While Hydro-Ouebec maintains that the James Bay Power Project is an economic winner, it refuses to reveal its cost analysis. Its current $23 billion deficit is expected to reach $60 billion by the year 2000 once the Great Whale Project is nearly completed.

A coalition of Cree and environmental groups are fighting to block power sales from Hydro-Quebec to the northeastern United States, armed with evidence that investing in energy efficiency, rather than buying new power from James Bay, is the environmentally responsible, economically prudent energy choice. US energy consultants estimate that by adopting simple conservation measures, Quebec — one of the most inefficient energy users in the world — could free up electricity equivalent to more than twice the capacity of the Great Whale River development before the year 2001.

Despite increasing heated opposition from Aboriginal people and environmental groups across Canada and the United States, the Quebec government is determined to bring the Great Whale and the Nottaway Broadback Rupert dams on line as fast as it can. To do this, the Quebec government has approved construction of hundreds of kilometres of access roads, airports and workers' camps, to begin in the spring of1991, without an adequate environmental review.

Grainne Ryder is a water resources researcher for Toronto-based Probe International.

Reprinted with permission from Probe International from Probe Alert.

WHAT YOU CAN DO:

Write letters to the government of Canada asking it to fulfil its obligations to the Inuit and Cree by immediately conducting an independent and public environmental review of both the Great Whale Project and the Nottaway Broadback Rupert Project.

Brian Mulroney
House of Commons
Room 309-S, Centre Block
Ottawa, Ontaria
K1A 0A6

Robert de Cotret
Minister of the Environment
House of Commons
Ottawa, Ontario
K1A 0A6

Premier Robert Bourassa
885 Grande-Allee East
Building J, 3rd. Floor
Quebec City, Quebec
G1R 4Y8

Write to the governors of New York and Vermont and ask them to immediately cancel their electricity contracts with Hydro-Quebec. Remind them that they need not be accomplices to the wilful environmental destruction and the abuse of Aboriginal rights associated with the James Bay Power Project. Rather, they can pursue environmentally sound energy efficiency measures toward greater energy independence for their states.

Mario Cuomo
Governor, New York
State Capital
Albany, New York
12224

Richard Snelling
Office of the Governor
Pavilion Office Building
Montpelier, Vermont
05676

HARVESTING THE FORESTS

Forests perform protective, productive and regulative functions. They play a vital ecological role in the planetary recycling of oxygen and nitrogen, producing over $300 billion of lumber, veneer and pulpwood each year.

But the world's forests are at risk. Temperate forests have fallen to lumbering and development, with acid rain and other air pollutants now threatening the regenerative capacities of what remains. In the developing world, forests are seriously in jeopardy. Examples of misuse abound. Some 160 million hectares of upland watersheds have been destroyed over the past three decades in the foothills of the Andes and the Himalayas, in the Central American highlands, the highlands of East Africa, and in the uplands of Ecuador and Peru. As many as one billion people are now affected by flash floods. The Himalayan region now has the dubious distinction of being the most degraded watershed on earth. As a result, flood damages in India have averaged US$1 billion a year in the last decade.

Of all forest habitats, none seems more threatened than the tropical rainforest. Forming a green belt around the equator, rainforests account for about 8 per cent of the planet's surface. Yet, they harbor a large percentage of the earth's species. In recent years, studies have shown that the world is losing up to 20 million hectares of tropical forests annually, an 80 per cent increase over earlier estimates! The pace of destruction could be even worse. According to the National Resources Defence Council, the new deforestation estimates based on larger satellite observations reveal that 16 to 20 million hectares are being cleared each year, about the area of the state of Washington.

Overall, more than half of the world's tropical forests have disappeared since the turn of the century. Clearing has taken a significant toll in South Asia, Southeast Asia, Central and West-central Africa, and tropical Latin America. Figures show that Africa has lost 60 per cent of its original rain forests; Central America and Southeast Asia nearly two-thirds. Pressures are such that ecologists fear that most of Asia's forests could disappear in the next forty years. But it is in the Amazon that the fiercest destruction has taken place: 8 million hectares of forest were cut down for pasture from 1966 to 1978. In 1988 alone, an estimated 20,500 km^2 of Brazilian rain forest — an area larger than Belgium — was reduced to ashes to give way to agricultural production and other uses, especially ranching. To make matters worse, the new settlers have displaced native Indians, who have lived sustainably in this forest for centuries. Such destruction, according to ecologists, is one of the great tragedies of our time. Future trends leave little hope. According to most estimates, developing countries are expected to lose another 40 per cent of what is left of their forests by the year 2000, as a result of land clearing and growing demands for wood supplies and fuelwood.

Wasting our bio-capital

When rainforests go, so too does a wealth of fauna and flora — genetic resources of precious value to human welfare. For some biologists, present destructive trends amount to nothing less than the death of birth. To British biologist, Norman Myers, it is "the greatest single setback to life's abundance and diversity since the first flickerings of life almost 4 billion years ago.

Spurred by poverty, population growth, ill-advised policies and simple greed, humanity is reducing biological diversity to its lowest level in the last 65 million years. The ultimate consequences of this collapse are beyond calculation and certain to be harmful. According to some estimates, in the next three decades, humankind will drive an average of 100 species to extinction every day. That, in essence, is the biodiversity crisis.

Treasures of a Rainforest

Tropical forests, found mainly in Southeast Asia, Central and West-central Africa, and tropical Latin America, contain by far the richest ecosystem on earth. According to a U.S. National Academy of Sciences report, a typical six km^2 patch of rainforest may contain 750 species of trees, 125 kinds of mammals, 400 types of birds, 100 different reptiles and 60 types of amphibians. In addition, each type of tree can support more than 400 insect species.

The loss of rainforests is distressing for other reasons, too: they influence climate and rainfall, protect watersheds and regulate water flows for farmers who grow crops that feed one billion people.

Does it matter?

Why should we care about the survival of tropical species we will probably never see! The answer is simple. Variety, say scientists, is the very stuff of life. Estimates of the total number of species inhabiting the earth may vary between 5 and 30 million. To date, however, only 1.7 million species have actually been identified. Ironically, since hundreds may be extinct by the year 2000, the world has neither the scientists nor the time to identify the as-yet uncounted. Such destructive trends leave specialists bewildered. It is, says biologist Daniel Janzen, as though the nations of the world decided to burn their libraries without bothering to see what was in them.

The loss of genetic diversity imperils the world's current food supply and jeopardizes the world's ability to feed increasing numbers of people. Crop breeders throughout the world are increasingly dependent on wild strains to improve domestic varieties. It also threatens the precarious supply of medicines. Half of all medical prescriptions dispensed in the world have their origins in wild organisms. In the U.S. alone, the value of these medicines and drugs amounts to some $14 billion a year. In Amazonia, indigenous people use more than 1,300 plants as medicines; many of these have yet to be studied by scientists. Hidden somewhere in the rainforest might be plants with cures for AIDS, cancer or multiple sclerosis.

Why the destruction?

Several reasons account for the destruction of the world's tropical forests. There is even considerable debate among experts as to which ones are the most important. One interpretation emphasizes population growth and growing food and fuelwood needs, the other logging and ranching. A third one blames government incentives and policies

Graphic News International, May 1991

for much of the devastation. As usual, reality is more complex, as these destructive agents are often inter-related, and act together in the same area.

In most regions, population growth is a major culprit. Both unfair distribution of land and low agricultural productivity are pushing poverty-stricken millions into clearing tropical lands for crop production. Much of the land cleared has poor-quality soil which erodes easily once cleared of its protective cover.

In West Africa and parts of Southeast Asia, the single most important cause seems to be commercial logging. Companies often resort to poor logging practices when they harvest the world's best hardwood — such as teak and mahogany — with the result that the damage is tantamount to destruction. Efforts are badly needed to undertake a sustainable management of forest resources. In Latin America, wealthy farmers have cleared large areas of tropical forests to raise cattle for export demands. Ranching in this region accounted for more than two-fifths of forest clearance between 1971 and 1986. In either case, forests are stripped without adequate replanting or restoring.

The conversion to agricultural land can also reflect a government policy to expand the agriculture base as in Brazil, or resettle people as is the case in Indonesia. It may also come as a result of huge projects (highways, dams and mining operations) that convert and destroy acres of previously undisturbed forest lands. In other circumstances, the demand for fuelwood and fodder and other forest products is putting severe strains on forests, especially where the resources cannot meet the demands.

In addition to creating severe water and land problems, deforestation is also affecting the world's climate. Deforestation is second only to the burning of fossil fuels as a source of carbon dioxide, accounting at times for as much as 33 per cent of the annual emissions of carbon dioxide, or 2.8 billion tonnes. Early estimates indicate that the annual build-up of carbon dioxide in the global atmosphere could be offset by reforesting 3 million km^2 of degraded lands in the tropics, at a cost of $12 billion a year for 12 years... or a small part, say experts, of the cost of adapting to the greenhouse effect.

Reprinted from Development, Spring 1992

Kenya women fight deforestation

By Daphne Topouzis

The greatest accomplishment of Kenya's grassroots Green Belt Movement, according to its head, Dr. Wangari Maathai, has been to get Kenyans to see the links between environmental degradation and such other issues as fuelwood shortages, inadequate food production and poverty.

Graphic: The Tribune

By planting some 10 million trees at the Movement's prompting, Kenyan villagers have not only contributed to protecting the environment in general but have also been able to draw immediate benefits, most notably in firewood supply. "This has helped change their attitude toward the environment," Dr. Maathai said during a recent visit to New York.

Deforestation should not be seen as an exclusively rural problem, she added. It contributes to rural-urban migration and the growth of large slum areas around Nairobi. "When you see a slum you do not immediately think of it as an environmental problem. But many of these people are what we now call 'environmental refugees', who have left their land because it is unproductive."

Dr. Maathai, a biologist and the first Kenyan woman ever appointed a professor at the University of Nairobi, was a founding member in 1977 of Save the Land Harambee (harambee is Swahili for "let's all pull together"), a community tree-planting campaign set up by the National Council of Women. This later became the Green Belt Movement. For her work in taking the environmental message to African women farmers, Dr. Maathai has gained international recognition, winning the first Better World Award in 1986, as well as the UN Environment Programme's Global 500 award. In October 1990 she became a member of an international committee of women environmentalists that will seek to ensure that issues of particular concern to women receive greater attention in debates on environment and development.

The Green Belt Movement relies exclusively on local expertise and advisors. "We decided that this was going to be our project," said Dr. Maathai. "We discovered that when outside experts come, they actually disempower people. They make them feel like they cannot do anything by themselves."

"We discovered that when outside experts come, they actually disempower people. They make them feel like they cannot do anything by themselves."

— Dr. Wangari Maathai

Much of the Movement's funding, however, comes from external donors, including the Nordic countries and the United Nations Development Fund for Women (UNIFEM). "We never have enough money," explained Dr. Maathai. "Because we are a women's non-governmental organization, we do not attract as many donors. So we are always on the road trying to fund-raise."

The example of Kenya's Green Belt Movement is having an impact on neighbouring countries in East Africa and southern Africa, where efforts are now being made to initiate similar movements.

Dr. Maathai identified soil erosion as Kenya's most pressing environmental problem. To counter the resulting desertification and deforestation — which directly affect the livelihoods of families dependent on subsistence agriculture — the Green Belt Movement devotes much of its attention toward tree plantings. It promotes the use of indigenous varieties that provide fuelwood and fruit, rather than the kind of "exotic" trees brought in by European settlers at the turn of the century. Some of these non-indigenous varieties use up excessive amounts of water.

The Green Belt Movement has established more than 1,000 tree nurseries and helped organize as many local groups, involving 50,000 households, comprising half a million villagers. In addition, some 3,000 schools, with one million students, are also involved in tree plantings.

"Women are by far our greatest target," said Dr. Maathai, "because they are the people who work the land in Africa." The women give tree seedlings raised in the nurseries to other farmers and neighbours free of charge. If the seedlings survive more than three months outside the nursery, the women get paid. "For many women who are subsistence farmers and have no food left over to sell, the money from tree planting is their only income," Dr. Maathai observed.

The Movement has encountered some tough problems in organizing women, however. Most are illiterate and speak different languages, making communications difficult. In addition, many of the women are so poor they are preoccupied with matters of everyday survival; unless they see quick results, they may abandon the project.

Nevertheless, progress is being made, not only in spreading environmental awareness, but also in strengthening rural people's self-confidence. "You can actually see change," Dr. Maathai said. "You can see people being empowered and realizing their self-worth. People realize that change can take place, and that it can be spurred by ordinary people with no formal education or sophisticated information at their disposal."

Reprinted from Africa Recovery, October-December 1990

Tree-huggers build 'a second line of leadership'

Misconceived forest policies — particularly single-species plantations and failure to involve people — have led to environmental degradation and popular anger in many parts of the world. But new leaves can be turned, as is shown by a village movement in India's Western Ghats mountain range.

The "Chipko" tree-hugging movement in the Himalayas has produced a sequel — Appiko — in the Western Ghats, the mountain chain which stretches more than 3,000 kilometres from north to south India.

Soon after Chipko leader Sunderlal Bahuguna visited Karnataka state, about 150 people from Salkani and Ballegadde villages joined hands around trees in a nearby forest to stop the lumberjacks. Some 600 trees marked for felling were saved by the action. Guard was maintained for several months, until the timber company gave up.

"It sounds like thse people have a tradition of respecting nature."

Graphic: The Africa File, VIDEA

This resistance, plus allegations of irregularities by the companies — including overcutting and clear felling in areas where only selective felling was permitted — prompted the Forest Department to make a survey of what was really going on in the forests. The team found that the people's action was justified, and complimented them on their timely action.

Others followed the protestors' example, and took action wherever green trees were marked for felling or where forest was earmarked for replacement by teak or eucalyptus plantations. More than 12,000 trees were saved.

The movement drew attention throughout the state, and in one area a visit by the Forest Minister led to a ban on all felling of green trees by the Department. Officials ruled that only dead and dying wood could by cleared, using properly defined procedures; plywood and paper industries found to be clearing more trees than their allowance were forced to stop logging.

Another effect has been the expansion of the Appiko movement, which uses street plays and folk songs, like the traditional Yakshagana, to mobilise opinion.

"Oh green forest
We now sing your praise
Please be kind to us
We had been harsh on you
We now repent our acts
Please forgive and pardon us
We seek your blessings."

The chorus of the new Yakshagana is being sung in the district administration headquarters by a group of young boys and girls as its composer, 43-year-old Mahabaleshwar Hegde, and an impromptu crowd listen intently.

"The Yakshagana runs for almost an hour," explains Hegde, "and it has many stanzas, each with appeals to the forest god, who has protected the villagers for generations. It ends with all the villagers pledging to protect nature and bring back peace and harmony along with the trees they intend planting."

"Oh green forest
We now sing your praise
Please be kind to us
We had been harsh on you..."

The 35-year-old Appiko leader, Pandurang Hegde, says that the songs and plays have played a vital role in the movement's ecological crusade. So have "eco-camps" and marches by villagers and schoolchildren.

The movement provides information on energy sources other than trees, undertakes re-planting in degraded village forests and promotes smokeless stoves.

"Regenerating greenery in barren areas using 'social fencing' (communally agreed forest and grazing areas) is a particularly important activity," says Pandurang Hegde, a social worker who has been championing the cause of the hill people. "About 200 hectares of scrub jungle has been brought under lush vegetative cover because of the unstinting efforts of our people."

Farmers enrich their land with organic matter gathered from the forest floor, and only fallen twigs are collected for stove fuel. Appiko activists guard the forests. One of them, 63-year-old Maru Mukri, says there has been "a great awakening" among villagers about the potential of the forests, which are now being regenerated.

"The most important reason for the quick spread of this movement was the bad forest policy," says Pandurang Hedge. "The Forest Department cleared natural forests on a large scale to make way for commercial monoculture plantations, which meant revenue for the Department at the expense of the local people.

"A lot of hardship was created, and agricultural yields fell steeply. Fodder, green leaf manure and fuel became scarce."

Forest cover in the region of North Kanara, for example, dropped from 81% to 25% in 30 years. The consequent land erosion led to falling farm productivity and in some areas to almost completely infertile "baked" laterite soils.

Narayana Hegde, the 80-year-old father of Mahabaleshwar, says that current harvests using improved rice varieties and modern practices hardly matched the production of 2,500 kilograms of paddy a hectare which used to be achieved using only organic manure: "Our soil has lost its vitality."

The jungle, he recalls, was "teeming with wildlife then. You couldn't cross the forest alone for fear of attack by wild animals. Now most of it is lost."

Adapted from a Photo by Rob Johnson/Panos Pictures

Climate and rainfall have also changed: "We had regular rainfall until 40 years ago, the rivers were always full, and the seasons were clear. Now the seasons overlap. Summer is protracted and winter cut short, which affects our crops."

Pandurang Hegde admits, however, that not all the blame for this collapse can be ascribed to the Forest Department. People also contributed to forest losses, by sheer force of numbers or by inappropriate practices.

"Appiko has tried to emphasise the people's duty. Before asking the government to ban commercial felling of green trees, villagers were persuaded to keep away from the trees. We must set an example before asking others to follow. The stress is on change of heart and on establishing a harmonious relationship with nature.

"We have shown the way with a series of grassroots actions in parts of remote hill regions in the Western Ghats. We have even forced the government to change part of its forest policy." The ban on allowing people to use "minor" forest produce, such as herbs, fruits, nuts and honey, has been relaxed. They are allowed to collect dry leaves and fallen twigs, and are consulted about which trees are used on afforestation programmes. Eucalyptus plantations were withdrawn after a public outcry.

Success boosted morale, and Appiko widened its activities, taking in, for example, promotion of ecological consciousness among children. "The larger objective is developing a sustainable life-style in the tropical regions of the Western Ghats," says Pandurang Hegde.

"The children's programme is the most important of our recent ventures. It is important of our recent ventures. It is essential to involve them in order to pass on the philosophy of the movement to the next generation. Our effort is aimed at preparing future members who can carry on the mission of preventing ecological destruction. We are building a second line of leadership to protect nature."

G. Venkatarami is agriculture correspondent of *The Hindu* newspaper. This article was written as part of a Panos Institute fellowship.

Reprinted from Panoscope Managazine, January 1992

Malaysian PM to Canadians:

Look in your own Back Yard First

The following is from a letter faxed by Dr. Mahathir Bin Mohamad, prime minister of Malaysia, to Vancouver resident Ramona Tibando, on Feb. 21 [1992]. On Feb. 15 Tibando, who is a member of the Western Canada Wilderness Committee, faxed a letter to the PM saying that she and her family were cancelling a trip to Malaysia because they could not tolerate the way the government treated the natives of Sarawak, a state of Malaysia. Specifically, Tibando complained of the recent arrest of Andy Urud, a native environmentalist heading a blockade on a logging road into some of the last remaining unlogged area in Sarawak.

In 1990, Urud joined Victoria environmentalist Thom Henley on a world tour to expose troubles in Malaysia.

Dear Mrs. R. Tibando,

"I am sorry that your family's plan to Malaysia have been cancelled. But it is your right to cancel it. It is also your right to believe all the lies about Malaysian logging activities. We do cut trees but they are done on a sustainable basis. There is no point in cutting down immature trees and destroying future prospects of extracting more timber.

Seventy percent of Malaysia is covered by trees of which four fifths are forest trees. Malaysia has proportionately more forest cover than any other country in the North. Incidently, Canada's total timber trade is actually bigger than Malaysia's total trade.

"The World's attention is on the tropical forests. Is it because they're more important or because we don't want to examine our own forest practices?"

— B.C. Environmentalist

Mr. Urud is not a privileged person even if he has friends abroad. His arrest is done under Malaysian law.

May I remind you that Canada belongs to the native Americans, the so-called Red Indians and Eskimos. You have seized their land or cheated them out of it, destroying their forests, killed their game and even killed them. Recently when they held a protest you used tanks and guns to displace them.

It is not too late for you to return the land back to the native Americans. I do not mean the token way you "give" a part of Canada to the Eskimos. You must restore complete independence and sovereignty over their lands to the various "Indian" nations you rubbed out. Just as the Croats and Serbs and Armenians are now regaining their identity and land, you must allow the "Indians" to regain theirs.

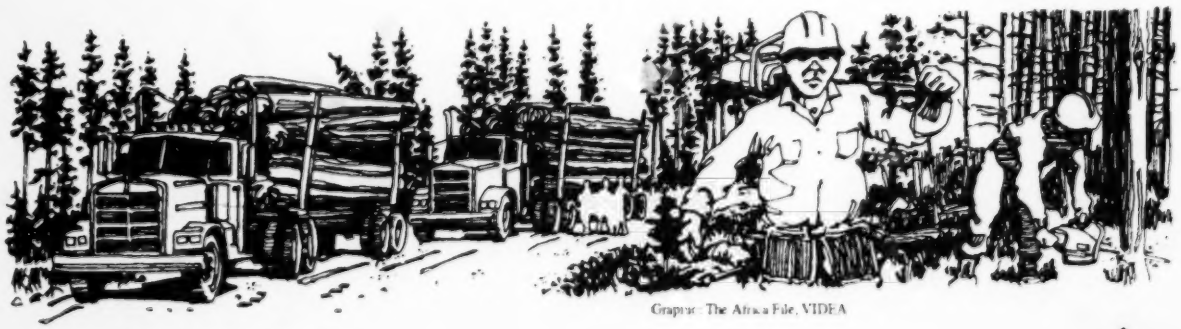
Canada can be totally reforested and returned to nature. The wolves and bears and other animals can once again roam freely and provide food for the natives. Factories and cities must be destroyed so as to recreate the pristine beauty of the land of the Amerindians and the Eskimos.

We believe this can be done if there is sincerity. You have made enough money at the expense of the people and the animals and forests of Canada. Now you can plough back your ill-gotten wealth into total rehabilitation. You can then return to wherever you came from and continue your massive pollution. We will not interfere with what you do in Europe or elsewhere so long as the smoke, the acid rain and the nuclear and toxic fallout do not cross our borders.

Like all Westerners you arrogantly believe that we live on your charity and you can always bring us to heel by denying us aid. I would like to point out that Canadian aid to Malaysia is insignificant. You are welcome to stop it as this is absolutely your right. For our part it is also our right to stop having relations with you. We are not interested in having lying, arm-twisting friends who feel that they are the only civilized people and know how to run this world. While you condemn us for taking action within our law you do not hesitate to pass judgement and "punish" us without a hearing on a basis of hearsay. I suggest that you examine your record with regard to moral behavior and the environment before you presume to judge and impose your opinion on others.

Yours sincerely,
Dr. Mahathir Bin Mohamad.

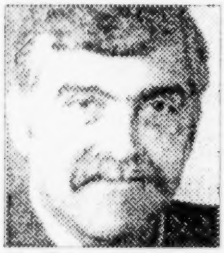
Reprinted from Monday Magazine, February 27-March 4, 1992



Graphic - The Africa File, VIDEA

Let's get the numbers on the table, Jack.

A Letter from Jim Fulton, a New Democratic Party member of parliament from Skeena River to Jack Munro, then the president of the International Woodworkers of America - Canada about the state of B.C.'s forests.


Jim Fulton, MP

February 8, 1991

Mr. Jack Munro, President
IWA Canada
500-1285 West Pender Street,
Vancouver, BC
V6E 4B2

Dear Jack,

First off, the speech I gave at the November CLC Environment Conference received a standing ovation from the brothers and sisters; a good number of them from forest sector communities.

Second, I am not on a campaign to put your members out of work; but it's obvious who is. Restructuring within the industry has brought about a new doubling in harvest (from 50 million cubic meters to over 100 million cubic meters) massive increases in corporate profits and close to one third of the organized workforce have lost their jobs to automation. An analysis of forest statistics for the years 1987-89 reveals that the US public received a whopping $16 per cubic metre net revenue from logging while B.C. received only two cents for the same volume.

Continued targeting of labour with technological change is clearly the forest industry agenda in BC. MacMillan Bloedel revenue figures from 1987 to 1990 were 9.6 billion. MacMillan Bloedel eliminated 9,121 jobs between 1980 and 1990. About 34,000 jobs were cut overall in the past decade due to automation, not alienation of forest land. During the 1950s, BC forests generated 2.64 direct jobs for every 1000 cubic meters cut. Today the figure is less than one direct job for every 1000 cubic meters. California, on the other hand, gets 5.2 jobs today for the same amount cut. The US forest industry overall generates 3.4 times as many jobs per cubic meter of timber logged! If the BC forest industry provided the same employment per volume of timber logged as just across the border, 66,000 new jobs could be created.

It seems to me that these factors — 1) overcutting and inadequate reforestation, 2) designation of forested lands for national and provincial parks, ecological reserves and for scientific purposes, 3) designation of forested lands and additional lands for carbon sinks in relation to Global Warming, 4) designation of lands for settlement of Comprehensive Claims — combine to place substantial pressure on government to come up with a realistic land use and tenure policy for our Province.

In comparing Canada to Brazil I used published data from Equinox September/October 1990:

- Size of Canada: 9.9 million square kilometres

Size of Brazil: 8.5 million square kilometres

- Size of all Canadian forestlands: 4.5 million square kilometres (45 percent of country)

Size of Canadian boreal forest region: 3.3 million square kilometres (34 percent of the country)

Size of Brazil's Amazon rainforest: 3.5 million square kilometres (41 percent of the country)

- Amount of all Canadian forests cleared each year: 12,220 square kilometres

Amount of Brazilian Amazon cleared or burned each year: 35,000 square kilometres

- Average amount of timber produced by Canada annually from 1984 to 1986: 421 million cubic metres

Average amount of timber produced by Brazil annually, 1984 to 1986: 493 million cubic metres

- Estimated amount of Canadian forest that is regenerating to a productive new forest (capable of supporting an industry in the future) within five years of logging: 55 percent

Amount of Brazilian Amazon that regenerates to a productive new forest after logging: virtually none

- Amount of productive Canadian forest that is now barren or "not sufficiently restocked" with a quality or species of tree capable of continuing to support industry: 10.3 percent, or 250,000 square kilometres

Amount of Brazilian Amazon protected (in parks, research sites and extractive reserves): 9.4 percent, or 328,704 square kilometres

- Estimated number of Indians and Metis living in the Boreal forest: 100,000

Estimated number of Indians living in the Amazon forest region: 170,000

About one acre per second of tropical rainforest is burned. In Canada the combined harvest and losses to fire and insects is one acre each five seconds.

Canada's inventoried productive forest land is 244 million hectares (Forestry Canada)

One hectare of forest can absorb and store between 150 and 300 tonnes of carbon (Green Plan)

Canada is the fifth largest per capita emitter of carbon dioxide on Earth: 4.5 tons per capita (World Resources Institute)

If the B.C. forest industry provided the same employment per volume of timber logged as just across the border, 66,000 new jobs could be created.

The Intergovernmental Panel on Climate Change (Geneva, November, 1990) noted: 1. "Climate will probably change faster than tree species can naturally respond (eg. through migration); 2. New sites may not be edaphically hospitable, having evolved over thousands of years under other climatic and vegetative regimes. Forests in areas of large climatic changes of the next 50 years will likely display massive

I think
by Martyn Turner
Proposed tree design for next time someone decides to create a rain forest.
THIS WAY UP
Graphic, New Internationalist, February 1990

readjustments, with concomitant large reductions in the area of health forests."

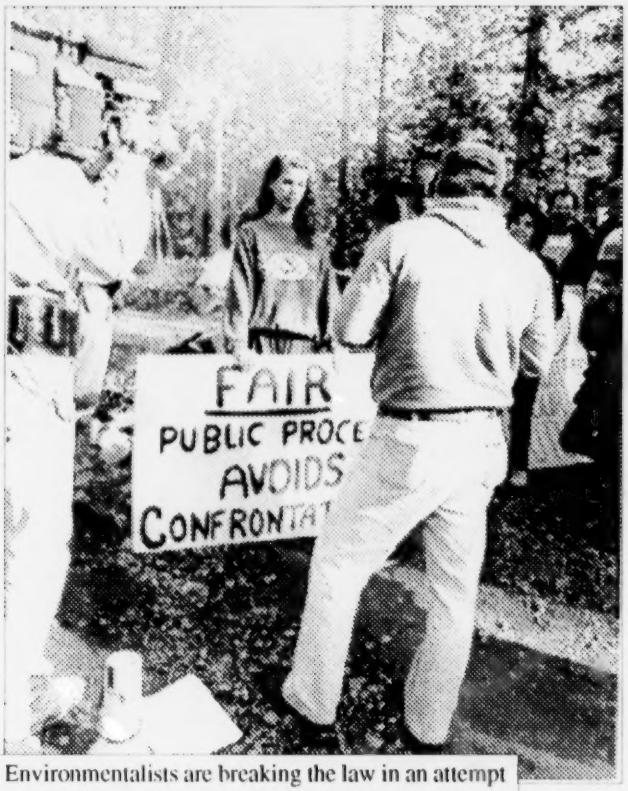
Dr. Maini of Forestry Canada noted: ... at best we can hope to maintain our present productivity. At worst, it could decline.

This material is the guts of my speech to the CLC. I recognize that you disagree with my position regarding South Moresby. My motion to Parliament however was endorsed by the Leader and Caucus. You may disagree with my positions on land designation for settlement of Comprehensive Claims but that is Party Policy. You may disagree with setting aside 12% of lands as recommended by the World Commission on Environment and Development (Brundtland Commission), but that is also Party Policy (Convention, 1989)

My publicly stated concerns about Climate Change and the role of forests are drawn from internationally recognized authoritative bodies such as the IPCC which represents the scientific view of 120 countries (including Canada).

In my view substantial amounts of land presently viewed by the forest industry as "banked harvestable fiber" will be designated for other purposes. We should work together to implement policies that create jobs on a smaller forest base and harvest because that is the future.

I do not find it helpful to be subjected to public attacks without substantiation. You may not like the message, but it is well founded in party policy and reality.



Environmentalists are breaking the law in an attempt to preserve the remaining Old-Growth in B.C.

I have spent the last twelve years working to get government to implement sustainable harvest practices so that we can have long term sustainable jobs. Industry has shown few signs of implementing structural changes to increase research and development, increase research and development, increase value added, respond to the backlog, respond to public demand for protecting old growth, and in particular to increasing the number of jobs per cubic metre cut. I will continue to find ways to restructure the BC Forest Industry to create more permanent jobs because it is government that will do it; not the forest companies.

As Les Reed of UBC stated, "My experience, working with trade unions and other people, is that 95% of the confrontation evaporates when you can agree on the numbers. It is just a basic fundamental principle of human behaviour. Get the numbers out there and agree on them, and it will be very easy for Jim Fulton and me to hang out our shingle as consultants helping people solve these problems, but we must have the numbers, you see." (Standing Committee on Forestry and Fisheries: March 7,1990).

Let's get the numbers on the table, Jack.

Sincerely,
Jim Fulton, M.P., Skeena

Excerpted from New Directions, July 1991

Old Forester's Tales...
Debunking Old-growth Myths

By Cliff Wallis

Owing to a past emphasis on forests as fibre factories, many old-forester's tales about old-growth have been handed down over the years.

Among the favorite descriptors applied to old-growth forests by misinformed forest managers are stagnant, decadent and overmature. It was these and other myths that were debunked in a recent paper by Dr. Peter Achuff, a forest ecologist from the University of Alberta.

The Fire Hazard Myth

The fact that old-growth forests have survived for thousands of years without stand-replacing fires should tell us something about their true fire potential. Fuel loads actually peak in relatively young stands while many old-growth forests are quite moist. The cooler environment under the dense and tall canopy is not at all conducive to fire, says Achuff.

The Insect and Disease Hazard Myth

According to the next most popular myth, older trees have more of what fibre conscious foresters call "defect," usually fungi-related which reduces the commercial value of the trees.

But this is only a hazard to producing lumber and the view ignores the importance of fungi in the forest ecosystem. It appears we should be more concerned about diseases and insects that arise from logging slash than from old-growth.

The Unhealthy Forest Myth

A related myth is the concept of forest health. Many ecologists disagree with many foresters on what a healthy forest is. Where a forester may see healthy future profit in a vigorous stand of trees, an ecologist sees a healthy forest in old-growth with its dead and dying trees. Ecologists point to complex nutrient cycling, the contribution of old-growth to the health of the watershed and the survival of a variety of rare and endangered plants and animals as signs of health.

The Wildlife Desert Myth

In Alberta alone, more than 300 species of flowering plants and 150 types of vertebrates live in various types of old growth woodlands. With nest sites in short supply in young forests, cavity nesting birds squabble over the few good sites in old-growth. Diminutive nuthatches, woodpeckers, owls and tree-nesting ducks rely on old-growth for shelter and perhaps survival. In one case, a single nest was discovered to have contained the eggs of a hooded merganser, a goldeneye and a barred owl.

Some wildlife inhabitants of old-growth actually contribute to the health of adjacent forests. A Colorado researcher found that woodpeckers will move into areas when insects reach epidemic proportions. The neighboring old-growth woodpeckers have been known to consume up to 98 percent of the spruce beetles in an adjacent area.

Meanwhile, researchers in Alaska have learned that while deer populations peak right after a forest is cut, they also peak again, only significantly higher, when the forest is between 100 and 300 years old.

The Sustainable Development Myth

Under the guise of forest management many foresters continue to cling to the notion that timber is always the primary resource to manage for. Too often non-timber values are perceived as being in conflict with the real business of fibre production. In the vast majority of cases when a traditional forester or politician claims "We are practising sustainable forestry" what they really mean is that when trees are cut, new ones are planted. But the only thing that may be sustained is the timber and not necessarily the dynamic wildlife-supporting qualities of the forest ecosystem, such as those found in natural old-growth forests. Under the same logic, it could be said that the prairies are being managed in a sustainable manner. Except in the process of sustaining the harvest of wheat and other prairie crops the environment has been compromised so seriously that the prairies contain more endangered species than any other major ecosystem in Canada.

"So what they're sustaining is business, not life."

Graphic: Africa File VIDEA

Reproduced from Borealis Magazine [2(2), 1990] with the permission of the publisher, the Canadian Parks and Wilderness Society.

The economics of biodiversity

by Jeffrey McNeely

Economists are sometimes seen as advocating slapping pricetags on nature. But since many of nature's values are abstract — what price can be placed on a bird singing in a meadow? — perhaps any prices will be misleading. Further, even if market values are established, they can change suddenly and unexpectedly.

Even so, economics is the language of today's decision-maker, so those interested in conserving biodiversity should learn to talk (and think) in terms of costs and benefits, opportunity costs and rates of return. Further, when the full environmental costs of exploitation of a resource are considered, it will often be apparent that much greater investments in conservation are justified. Economics, used properly, can provide a powerful tool for conservation.

Graphic: Our Planet V4, N2, 1992

It is apparent that some biological resources can be easily transformed into revenue through harvesting, while others provide services without an obvious price-tag. Therefore, in order to base decisions on allocating scarce resources on the best available information, different methods are required to quantify the magnitude and value of the positive and negative impacts.

There are three main approaches to measuring the economic benefits of conserving biodiversity:

Consumptive use value

Consumptive use values assess the value of nature's products — such as firewood, fodder and meat — consumed directly without passing through a market. These are often very important to rural communities. For example, firewood and dung are used to provide over 90 percent of the total primary energy needs in Nepal, Tanzania and Malawi and exceed 80 percent in many other countries.

A study of four indigenous Amazonian Indian groups found that they used from half to two-thirds of all forest trees as food, construction material, raw material for other uses. None of this very extensive use is considered when calculating the annual income of such groups, even though the value of replacing such goods from other sources would be considerable.

Consumptive use value can be assigned a price through such mechanisms as estimating market value if the product were sold on the market instead of being consumed. In Sarawak, Malaysia, for example, a detailed field study found that wild pigs harvested by hunters had a market value of some US$100 million per year.

In terms of economic development, perhaps the most important point of consumptive use is that some rural communities close to forests or other natural areas can prosper through the sustainable harvesting of wild species, and almost all rural communities can gain at least some development benefit through proper management of biological resources which are consumed directly. Relatively small investments aimed at ensuring that such management systems continue to prosper can help avoid the much larger investments which are often required when biological resources have been so severely degraded that expensive environmental rehabilitation projects are required.

Productive use value

This value is assigned to products which are commercially harvested for exchange in formal markets, and is therefore often the only value of biological resources which is reflected in national income accounts. Productive use of such biological resource products as fuelwood, timber, fish, animal skins, musk, ivory, medicinal plants, honey, beeswax, fibres, gums, resins, rattans, construction materials, animals harvested for game meat, fodder, mushrooms, fruits, dyes and so forth can have a major impact on national economies. Estimates of such values are usually made at the production end (landed value, harvest value, farmgate value, etc), rather than at the retail end, where values are much higher because of the costs and value added through transport, processing, and packaging.

The percentage contribution of wild species and ecosystems to the economies of developing countries is usually far greater than it is for an industrialised country, especially if consumptive use value were included. Timber from wild forests, for example, is the second leading foreign exchange earner for Indonesia (after petroleum), and throughout the humid tropics governments have based their economies on the harvest of wild trees. The total exports of wood products from Asia, Africa, and South America averaged US$8.1 billion per year between 1981 and 1983.

Non-wood forest products can also be of considerable value. Indonesia, for example, earned some US$200 million in foreign exchange from non-wood forest products in 1982, while non-wood forest products in a recent year provided 40 percent of the total net revenues accruing to the Indian government from the forestry sector, and 63 percent of the forestry exports.

While market prices represented by productive use value can be an impor-

tant indicator of value, the market price is not always an accurate representation of the true economic value of the resource, and does not deal effectively with questions of distribution and equity. It is also apparent that consumers may value resources in ways different from producers; tropical forests are valued by consumers of scenic beauty differently than by consumers of lumber products, but no market is available to mediate these claims.

Indirect values

Indirect values assess the indirect values of ecosystem functions, such as watershed protection, photosynthesis, climate regulation and soil production (non-consumptive use values), along with the intangible values of keeping options open for the future and simply knowing that certain species exist (option value and existence value respectively).

These values do not normally appear in national accounting systems, but they may far outweigh direct values when they are computed. They tend to reflect the value of biological diversity to society rather than to individuals or corporate entities.

Direct values often derive from indirect values, because harvested species of plants and animals are supported by the goods and services provided by their environments. Species without consumptive or productive use values may play important roles in the ecosystem, supporting species that are valued for their productive or consumptive use. In Sabah, Malaysia, for example, recent Studies suggest that high densities of wild birds in commercial *Albizia* plantations limit the abundance of caterpillars that would otherwise defoliate the trees; the birds require natural forest for nesting.

Most such benefits will fall into one or another of the following categories:

- Photosynthetic fixation of solar energy, transferring this energy through green plants into natural food chains, and thereby providing the support system for species which are harvested.
- Ecosystem functions involving reproduction (pollination, gene flow, cross-fertilization), maintenance of environmental forces and species that influence the acquisition of useful genetic traits in economic species, and maintenance of evolutionary processes leading to constant dynamic tension among competitors in ecosystems.
- Maintaining water cycles, including recharging groundwater, protecting watersheds and buffering extreme water conditions such as flood and drought.
- Regulation of climate, at both macro- and micro-climatic levels (including influences on temperature, precipitation and air turbulence).
- Production of soil and protection of soil from erosion, including protecting coastlines from erosion by the sea.
- Storage and cycling of essential nutrients, e.g. carbon, nitrogen and oxygen, and maintenance of the oxygen-carbon dioxide balance.
- Absorption and breakdown of pollutants, including the decomposition of organic wastes, pesticides, and air and water pollutants.
- Provision of recreational, aescetic, sociocultural, scientific, educational, spiritual and historical values of natural environments.

Conclusion

The future is uncertain, and extinction is forever. Society should prepare for unpredictable events, both biological and socio-economic. This calls for a safety net of diversity — maintaining as many gene pools as possible, particularly within those wild species that are economically significant or are likely to be.

Natural habitats preserve a reservoir of continually evolving genetic material which enables the various species to adapt to changing conditions. The plants and animals conserved may spread into surrounding areas where they may be able to be cropped at some future date, or may eventually contribute genetic material to domestic crops or livestock. Protecting natural habitats can therefore be seen as a means for nations, especially those in the species-rich tropics, to keep at least part of their biological resources intact for the future benefit of their populace.

As a result, society as a whole may be willing to pay to retain the option of having future access to a given species or level of diversity. As the demand for biological resources grows while the supply continues to dwindle (if current trends continue), their value is likely to increase. Therefore, some economists suggest that conventional cost-benefit relationships need to incorporate mechanisms to deal with the probability of higher future values and the irretrievability of lost opportunities to preserve natural environments and genetic material.

Wild species and the genetic variation within them make contributions to agriculture, medicine and industry worth many billions of dollars per year. Perhaps even more important are the essential life processes that are carried out by nature, including the stabilisation of nurseries and breeding grounds. Conserving these processes cannot be divorced from conserving the individual species which make up natural ecosystems.

The developing countries are particularly vulnerable to abuses of biological resources because they tend to be agrarian societies with the bulk of their populations living on the land rather than in cities; biological resources make a far greater contribution to local economies (at least in percentage terms) than they do to the national and international industrial economies.

Species that are important to human welfare in both developed and developing countries are not limited to wild plants that are relatives of agricultural crops, or animals or plants that are harvested for food, fuel, or medicine. They also include species such as earthworms, bees and termites which may make even more important contributions to society in terms of the role they play in maintaining healthy and productive ecosystems.

For further information contact: Jeffrey McNeely, Chief Conservation Officer, IUCN, 1196 Gland, Switzerland.

Reprinted from Ecoforum, V14, N5

Vanishing species and new zoos

The balance sheet on Earth's species still records heavy losses. A unique frog that gave birth to its young by vomiting (the gastric brooding frog) has disappeared forever. Another, the torrent frog, which sent messages to its partner by waving its hands, also hopped off one day, waving a last goodbye. Both were from Australia, but the same thing is going on among frog populations all over the world.

No one knows exactly why this is happening, but Alan Pound, a herpetologist (an expert on reptiles and amphibians) at Stanford University, points to a likely human cause: Frogs breathe largely through their moist skins, he says. This makes them particularly vulnerable to air and water pollution. Perhaps, says Pound, these amphibians are sending out an early warning that we are marching toward "environmental suicide."

Canada's own wildlife balance sheet is also awash with red ink. This year, 21 species have been added to the list of endangered or threatened mammals, birds, reptiles, amphibians, fish, and plants. Polar bears and grizzlies are vulnerable because of declining numbers, but not yet threatened. The Louisiana thrush is a vulnerable bird, while the loggerhead shrike is listed as threatened. The white prairie gentian and golden seal are threatened or endangered plant species. The eastern massasauga (a rattlesnake) is threatened. This year's list brings to 213 the number of species known to be in danger or extinct in Canada.

As species vanish daily around the globe, new types of zoo are trying to become the 21st century "arks" which will save at least some of them. The U.S. National Zoo is one example. The Metropolitan Toronto Zoo is another. These and other prestigious "arks" around the world are attempting to breed endangered or rare species and then to resettle them in their natural, wild habitat.

It sounds simple, but the complications are enormous. It costs roughly $25,000 for the U.S. National Zoo to breed each golden lion tamarin (a monkey), return it to Brazil, and prepare it for the wild. The monkeys are cute and charismatic, but for that much money ten different kinds of non-appealing bugs, birds, or snakes might be saved. So, who gets aboard the ark? Zoos have a check list which quickly eliminates many candidates and tends to favour showcase species such as the wild horse or the Siberian tiger.

"What about preserving wilderness? Wouldn't that save a bunch of species at once?"

Graphic: Africa Fule, VIDEA

When the breeding program succeeds, as it often does, zoologists tackle the ultimate purpose of releasing the species in the wild and coaxing it to survive. All too frequently, this ends in defeat. The animal, bird, or fish, used to human care, can't compete with wild enemies or rivals and falls a victim to Darwin's law (only the fit survive).

Zoo people are trying everything: "hard release" (sink or swim); "soft release" (some early protection); simulating wilderness conditions before release. To get an idea of how release methods are working, U.S. Fish and Wildlife scientists studied 405 efforts to reintroduce animals into the wild. More than 60% of the species didn't make it. Yet, the new zoos keep trying.

1. Write to the Ministry of Forestry in your province or territory asking for information on forest management. Write a summary of data received and rate provincial regulation of forests as excellent, good, fair, or poor. Discuss the ratings in class.
2. Contact the zoo nearest to your community and ask about its species breeding program.

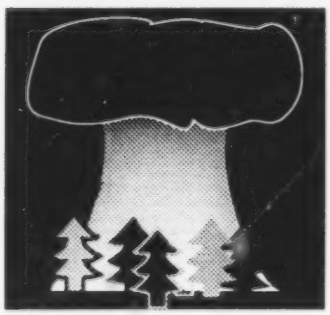
CHARLES A. WHITE

Reprinted with the permission of Canada and the World magazine [Oct. 91], Oakville, Ontario

Militarism and Environmental Security

While conflict accelerates environmental degradation, a deteriorating environment exacerbates conflict. ***Simon Rosenblum*** *explores the symbiotic relationship between militarism and environmental degradation.*

On a global scale, climate change and ozone depletion are formidable challenges to the safety and well-being of the entire human race. And these are not only future threats. One prominent French agronomist, Rene Dumont, argues that global warming is already causing drought, which in turn has resulted in declining food production. Of the 10 million deaths he attributes to starvation in 1988, Dumont says at least one million were caused directly by the greenhouse effect. Desertification and deforestation are also taking their toll. A United Nations Environment Programme survey estimates that 35% of the earth's land is in various stages of turning into desert. More than 135 million people now live on lands experiencing severe desertification. Thus security, says the World Watch Institute, "must now embrace a new race — the race to save the planet."



War and the Environment

One need only remember the environmental havoc in Southeast Asia caused by the Vietnam war to understand the environmental impact of war and the preparation for it. Militarization also can be the driving force behind environmental problems far-removed from the front lines of conflict. Radiation leakages in the American weapons program, for example, are a major health and environmental hazard. (The Pentagon is the largest single generator of hazardous wastes in the United States.) In a very different context, the environment and culture of the Innu are being threatened by low-level flight testing in Labrador. Moreover, military use of energy resources is such that the Washington-based Center for Defense Information estimates that the fuel consumed by the US Department of Defense in a single year would run the entire American public-transit system for 22 years!

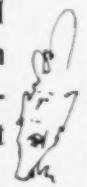
There are also indirect environmental implications to the international arms trade. To import weapons, developing nations require huge amounts of foreign currency, and this in turn creates pressures to increase foreign exchange earnings through the export of resources. More and more land gets transformed into cash crop production, leaving many peasants landless or pushing them into marginal lands. The displacement of the rural poor onto marginal lands contributes to both deforestation and desertification through the felling of forests and livestock overgrazing grasslands, and they will overuse marginal land. Thus the poor suffer disproportionately from environmental damage, and their poverty further contributes to environmental decline. As the World Commission on Environment and Development (the Brundtland report) noted: "A world in which poverty is endemic will always be prone to ecological and other catastrophes."

Environmental Degradation as a Threat to Peace

The social, economic and political consequences of environmental degradation fuel increased political and military conflict, not only within countries but also internationally. Resource wars, the fight to control raw materials, energy supplies, land, river basins and other key environmental resources, are likely to increase as environmental change increasingly threatens them. Water is a primary example. More than 200 of the world's rivers flow across state boundaries and more and more water is being removed from use by pollution, soil erosion and hydro-electric dams. The depletion of non-renewable resources similarly produces military conflict, notably as import-dependent industrial countries (the United States, Russia, Western Europe and Japan) seek to assure access to scarce strategic material.

If temperatures rise over the next few decades due to the greenhouse effect, severe droughts and heat waves will happen more often. And if sea levels rise because of the warmer temperatures, salt water would cover heavily populated coastal areas, leaving millions of environmental refugees looking for basic food and a place to live — creating and exacerbating regional strife. In Indonesia, Central America and sub-Sahara Africa, millions have been forced to leave their homes, in part because of the loss of tree cover (deforestation), the disappearance of soil (desertification), and other environmental ills that have made it impossible to grow food. The current conflict in El Salvador has been referred to as the western hemisphere's first "ecological war."

"For some reason I haven't thought much about connections between the environment and war.



Graphic Africa Fde. VIDEA

A step removed perhaps is the economic dimension. A great many developing countries depend largely for their development prospects on the natural resource base — soil, water, and vegetation — that sustains much of their economic activity. As cropland soil erodes, water supplies fail and forests and grasslands are depleted, their economies are undermined. And when economic growth slows or stops, social strains emerge and political systems become destabilized. The response is quite often a military one, either within a country or with neighbouring nations.

Making Peace With The Planet

The pursuit of military might is such a costly endeavour that it drains away resources urgently needed to protect against environmental perils. The Brundtland commission argued, for example, that Ethiopia could have reversed the steady advance of desertification threatening its food supply in the mid-seventies by spending no more than $50 million a year to plant trees and fight soil erosion. Instead, the government in Addis Ababa pumped $275 million per year into its military between 1975 and 1985 and its fight in Eritrea and Tigray. Similarly, on a global basis the Worldwatch Institute estimates that the global community would have to expend a sum of $774 billion during the final decade of this century to turn around adverse trends in four priority areas: protecting topsoil from further erosion, reforesting the earth, raising energy efficiency and developing renewable sources of energy. Meanwhile, the annual global military budget is over one trillion dollars.

These environmental problems transcend national borders and cannot be solved at the national level. Neither are there military solutions to environmental insecurity. Consequently effective environmental policy requires an unprecedented degree of international Cooperation in a world more characterized by non-cooperation. The Brundtland commissioners called for "a foreign policy for the environment," and Maurice Strong, the influential Canadian who was the first head of the United Nations Environment Programme, points out that "People have learned to enlarge the circles of their allegiance and their loyalty, as well as the institutions through which they are governed, from the family to tribe to the village to the town to the city to the nation state. We are now called upon to make the next and final step, at least on this planet, to the global level."

Some progress has been made. A number of nations — including Canada — joined together to form the "30-per-cent Club" in regard to airborn pollutants (particularly sulphur dioxide emissions). And the Montreal Protocol on the ozone layer, while highly insufficient, is an important precedent for a multilateral environmental strategy. Yet on the more challenging issue of global warming there has been no progress towards forging a worldwide treaty limiting the release of carbon dioxide. Neither have the industrialized countries accepted that they will have to transfer financial resources, as well as technology, to the developing world to pay for environmental programs. So far only two countries (Norway and the Netherlands) have made actual offers of such financial assistance.

Michael Renner of the Worldwatch Institute talks of the necessity of moving from military to environmental alliances. Not only the environment would benefit in the process, for as George Kennan — the acknowledged architect of the Cold War and, more recently, disarmament advocate — has noted, "in the very process of collaboration in a necessary and peaceful process, useful to all humanity, the neurotic impulses of military and political rivalry would be bound to be overshadowed; and the peoples might find, in the intermingling of their own creative efforts, a firmness of association which no other intergovernmental relationships could ever assure."•

Reprinted from Ploughshares Monitor, September 1990

Militarism vs the Environment

The environment is "in". It's cool to be green. In spite of this sudden concern, however, we continue to ignore one of the world's major polluters: the military. The issues of peace and the environment cannot be separated; militarism is a major cause or the environmental crisis we find ourselves in. We must recognise this.

Our planet is being scarred by military training, testing, manoeuvres and accidents. At the same time the armed forces produce huge amounts of hazardous waste and divert money and resources away from the environment. In tackling the world's polluters, we inevitably come up against the world's armed forces!

In virtually every "defence establishment" — and Canada's is certainly no exception — one finds a view of security which involves us and them. To deal with the mounting environmental crisis, the increase in the gap between the poor and the rich, and the end of the Cold War, it is imperative that we find a new definition of security which does not depend on military might. Our present view of security causes national interests to be put ahead of international ones, including environmental concerns. This justifies the practice of buying national "security" at the expense of the environment.

In 1987, $1.8 million was spent each minute for military purposes. Twenty percent of the world's scientists are presently engaged in military research and development. If even a fraction of these human and financial resources were spent fighting pollution we would likely see staggering results. As it stands, however, there was thirteen times as much money spent on the Department of National Defence in the 1990-91 Canadian budget as on Environment Canada.

In addition, many Third World countries maintain a large military. The huge sums required to maintain these armies are obtained at the expense of the environment. In order to get foreign currency to buy arms, the governments support cash crops which ruin the soil, over the food crops needed to feed the people of the country. As a result of their poverty, the people of the Third World are forced to exploit their environment just to survive. They cut their forests and overuse their land. In this chain of events, the main losers are the people and the environment.

World powers use methods of testing and training which often have a huge negative impacts on the environment. Whether in nuclear weapons testing or chemical weapons research, we have released toxic substances into the ecosystem, often enough to kill hundreds of people. Until 1958, for example, nuclear testing was carried out above ground, releasing tonnes of radio-active particles straight into the atmosphere.

We train our soldiers in situations which simulate emergency or war situations almost to the letter; in other words, simulations which pollute.

Training in Goose Bay, Labrador, for example, will create noise beyond the point at which a human finds it painful, release tonnes of carbon dioxide into the air, and risk dangerous crashes. It has forced the native Innu people, who live and hunt in the region, to take action.

In Victoria test burns are polluting the city, creating health problems for many chemically-sensitive people.

The disposal of nuclear and conventional military wastes represent an environmental problem we have yet to deal with. As Dr. Edward D. David, U.S. President Nixon's Science Advisor, once noted about nuclear waste: "One has a queasy feeling about something that has to stay underground for 25,000 years before it is harmless." This is an inaccurate figure; in the case of plutonium, a man-made radioactive substance, 250,000 years is be a closer figure. Whatever the details, three-quarters of the nuclear waste in the world today is military in origin. Some of the more reactive wastes cannot even be safely buried; they can explode under the "right" conditions.

Conventional wastes also pose a problem, in particular highly toxic wastes such as PCBs and chemical weaponry (ie. nerve gases).

Military accidents are also an environmental threat. From 1965-85, the U.S had 32 "broken arrows" (near accidental atomic detonations). Due to naval accidents there are now over 50 nuclear warheads and nine nuclear reactors on the ocean floor, many of which have imploded under the pressure of the ocean, exposing their radioactive components to the sea water. Although everyone knows about Chernobyl and what a reactor meltdown could do, few know that both superpowers have had coolant problems with their nuclear powered vessels which could have led to a meltdown in which the radioactive materials would have heated up and melted through the ship and into the sea.

Of all the actions the military can take which damage the environment, the worst is war. Nothing can match the environmental degradation caused by the tonnes of explosives dumped over Europe in both World Wars, the dropping of two atomic bombs at the end of the second World War, the spraying of hundreds of thousands of acres of jungle with herbicides during the Vietnam war, and the desertification which is the result of wars still continuing in Africa and elsewhere. And nothing could ever match the destructiveness of an all-out nuclear war — a battle which could end in mass extinction on a level not seen since the dinosaurs vanished.

We have long known that the military buildup was threatening to destroy us. What we have yet to realize is that "ecocide" has already started, and that we, and our planet, are the victims. A new type of security, which encompasses the entire planet, not just those with the most bombs, is needed for our survival. A "common security" which respects both the nation and the planet is what we and our elected officials must hope for.

Reprinted from the 1st of 8 pamphlets on Militarism and the Environment with permission from the Greater Victoria Disarmament Group © 1990.

THE ENVIRONMENTAL AFTER-EFFECTS OF WAR

by SHANE CAVE

While the oil damage from the recent war over Kuwait has been obvious enough — the number of fires, spills and slicks and the volume of oil involved was still being assessed at the time of going to press — the damage to the land over which the war was fought has been less obvious because of the war itself. And the combined effects of the vast number of vehicles and the bombardment will scar Iraq, Kuwait and Northern Saudi Arabia for decades.

The desert is both harsh and fragile. While the sand relentlessly grinds away at vehicles and equipment, they too damage the desert, especially tracked vehicles like tanks. The closest modern battle to that of the war over Kuwait was at El Alamein in northern Egypt in October-November 1942. According to Dr Arthur Westing, a researcher into the environmental effects of war, the effect of the large numbers of tanks involved in that battle so loosened the topsoil and sand of the region that dust storms in northern Egypt increased tenfold in number and their severity increased as well. The phenomenon persisted for several years before some vegetation could return and topsoil could stabilize.

Libya, too, was the scene of considerable conflict in World War Two and the effects of the conflict are still being felt today. Not only was there physical disturbance to the landscape, but the legacy of unexploded bombs, mines, artillery shells, grenades and bullets has killed several thousand Libyans, and significantly reduced agricultural production. That the effects should be so widespread is hardly surprising given that approximately five million mines alone were deployed during that war. This deprived post-war Libya of 183 000 hectares (452 000 acres) of grain-producing land and it took until 1972 to completely clear this valuable agricultural land. The cumulative loss of production has been estimated at around 980 000 tonnes of grain. Unexploded munitions from World War Two made over 450 wells inaccessible to Libyans and killed vast numbers of wild and domestic animals. Although their geography is very different, Poland, Germany, France, Vietnam and Cambodia among many others, have all faced similar long-term damage to people animals and land.

While the agricultural potential of the area on which the war over Kuwait was fought is not directly comparable to Libya or northern Egypt, nor was the scale of the bombardment. A greater tonnage of munitions was reportedly dropped and fired during this war than during the whole of the World War Two, and in a much smaller area. The most environmentally damaging of all the explosives used on land in this war were the fuel-air explosive bombs used to clear minefields. They also pulverized what ever topsoil had formed in the desert and destroyed any vegetation that had established itself. It will probably be more costly in time and money to clear the land and waters around Kuwait and Iraq of very dangerous unexploded bombs, shells and mines than to clean up the maritime oil slicks.

Access to, and cleanliness of, freshwater is also threatened by the after-effects of the war. For a start, the oil washed up on shore has in many cases been bulldozed into open storage pits. Generally, these were lined with plastic sheeting; but the surrounding war did not always make this possible, so that beached oil and any small amount of oil stored in pits or leaking from land installations poses a danger to the security of water supplies.

On the positive side, however, the intensive Saudi Arabian agricultural development of the past 20 years, which has seen the Kingdom become a net exporter of wheat, has demanded vast water usage. This has lowered the water table in much of the area in which the war was fought and means there is a greater depth for the oil to percolate, and therefore more security for the aquifers.

But the aquifers are also threatened by the sewage from the vast military force and its support staff which were assembled for the war — on the Allies side alone, this totalled over 700 000 people. The forces of both sides were stationed in areas where there was no facility to cope with the sewage generated which, for the Allies, was estimated at 45.5- 54.6 million litres (10-12 million gallons) a day. Much of this will have been buried and can percolate through the sandy soils of the region a little more readily than the oil. This could, at some stage in the future, threaten further agricultural production, and human and animal populations.

While the region around Kuwait does not have large resident wildlife populations, it is a vital stop-over point for migrating birds going between Africa, Asia and Europe. Acid rain fallout from the burning oil and the oil itself on beaches could cause considerable damage to breeding and migratory patterns and total populations of some bird species.

Other coastal damage came from the amphibious landings of troops. In the final land battle, an amphibious landing was not made, but practices in the lead-up to the land war did leave a number of beaches decimated — just from the movement of vehicles alone. One Saudi Arabian Ministry of Environment team on a coastal inspection came across a beach used for practice where almost all vegetation and a lot of coral reef had been destroyed, and the beach strewn with litter-packaging, equipment and even live ammunition. The scale of beach damage simply from practice operations can be appreciated when just one amphibious operation in Oman involved 18 000 US marines.

Reprinted from Our Planet, V3, N2, 1991

Innu Women Defy Military

By: PAM MAYHEW, KATHARINE INGS and RITA PARIKH

"It's very scary to imagine what the future holds for my children and grandchildren, once the land and animals are further weakened and destroyed."

Elizabeth Penashue,
Court Testimony April 6, 1989

Elizabeth is one of many Innu immersed in the struggle against the military presence on their land. It is a struggle in the face of environmental and cultural devastation, one which has taken many Innu off their land and introduced them instead to the environment of courtrooms and prison cells. And it is a struggle in which Innu women are at the forefront.

The Innu (The People), who number some 10,000 are one of the last hunting and gathering cultures in North America and have inhabited the area in the Quebec/Labrador peninsula called Nitassinan (Our Land) for some 9,000 years. The Innu women see Nitassinan as their key to cultural survival. It is their link with the past and their hope for the future, a means of reclaiming a pride in their once powerful culture. In the past decade the Innu women have mounted countless protests against both the transformation of traditional hunting grounds into experimental bombing ranges and the invasion of their skies by thousands of low-level test flights.

The militarization of the North began with the establishment of a Canadian Forces Base at Happy Valley-Goose Bay during the Second World War. Since 1967, when the British began testing their nuclear-capable bombers, the number of low-level flights has increased steadily. Indeed one Innu family has recorded, on one day alone, more than 25 flights at just over tree level. Great Britain, West Germany, the Netherlands, and the United States conducted most of the 9,000 flights during the past year.

The North Atlantic Treaty Organization, of which Canada is a member, defends the flight testing as an integral pan of its war fighting doctrine — flying at altitudes of just over 100 feet affords the aircraft protection from enemy radar. But the Innu argue the damage to Innu health and their environment, indeed the destruction of their entire way of life and culture, makes it imperative that their demand to stop the flights be heeded.

The detrimental health effects have been apparent from the beginning. The sonic booms which sound as jets travel overhead produce involuntary reactions in the body which are often accompanied by an increase in hormone production, a weakening of the immune system and stress-related disorders.

Yet it is the damage to land and wildlife that has most angered the Innu. The Innu argue that residue from jet exhaust and fuel discharged into the atmosphere have contaminated both their drinking water and fish.

Still, the Department of National Defence, in its $6 million environmental impact study, released in November 1989, concludes that any environmental harm (if low level flying increased) would be negligible", and that economic benefits would outweigh any loss.

The Innu know otherwise.

"I went to the experimental bombing range last fall with two other women," Elizabeth said. "We were told they would only use a small bomb. But we found great big ones up there. I know what has happened to the land where they are dropping the bombs. I know little tiny trees cannot grow where they are dropping these bombs."

"I know little tiny trees cannot grow where they are dropping these bombs."

Wildlife species including the caribou, beaver, mink and geese have shrunk not only in numbers, but also in actual size. The sonic booms have led mothers to abort more frequently, and have left many unable to adequately feed their young. Most serious, perhaps, has been the effect on the caribou which have been frightened off their traditional migration routes which guaranteed their access to food in the past. As a result, thousands of caribou have starved themselves to death and numbers and size of herds have been drastically reduced.

In response, the federal government has imposed strict hunting bans. Yet hunting has for centuries been central to

Innu culture. Traditionally, Innu groups go "in-country" in the spring and summer to hunt, fish, trap, and to teach their children the old ways. It is out of this special relationship with the land that the Innu have developed a deep respect for its riches, a respect handed down from generation to generation.

Yet this way of life has been progressively assaulted. Rose Gregoire is a leader in the resistance to the militarization of the North. "If the environment and the land are destroyed, the animals will not be fit to eat and the people will be frightened to go 'in-country'. They will not teach their children the old ways. The people will be stuck here in the community and they'll drink themselves to death," she says.

Rose attributes the social disintegration of Innu community to the expanded presence of military personnel. That women have been particularly affected by this presence is evident in one statement made by an Innu women at a workshop on family violence.

"Military development ... will lead to our destruction by social ills: ... deserted pregnant women, disgraced women who are labelled by their own community members, children growing up who will never know their fathers, women abandoning their culture by marrying men of another culture. Young women frequent military bars, becoming hopeless alcoholics."

Rose puts it more bluntly. "The military are raping Mother Earth and they are raping our daughters."

Four years ago, frustrated by the social chaos in their community, and by the perceived inability of the (male) elders to react to it, a handful of Innu women decided to take action. Together they formed the Sheshatshit Women's Group (Sheshatshit is the community in which much of the protest action has been organized). The women believe that to gain control of their lives, to halt the assault on their culture, the Innu must first gain control of their land.

And to do this, the women saw the need to organize separately, outside the political structures already established in Sheshatshit. Organizations such as the Band Councils, a non-traditional system of self-government from which Innu women are excluded, (in Sheshatshit, the Band Council consists of four councilors and a Chief) were imposed upon them. They are not Innu and do not work well in Innu society where traditionally all people regardless of gender are involved in decision-making.

"In our culture, women used to do the hunting with or without their husbands," Rose says. "I can remember my mother when we were in the country. She used to do everything — set traps, shoot animals — I can also remember my father — he could not make a decision without my mother's approval. They both had to make a decision."

So the women started to strategize. They began the non-violent occupation of militarized bombing zones close to Sheshatshit. Then they took their peaceful protests to the airstrips of the Canadian Forces Base.

Men in the community, unused to seeing women attend meetings and speak in public, at first found it difficult to accept women's leadership. Yet the women were joined, after many, many months, first by the Chief, and then by community elders.

The Innu have occupied the airstrips and bombing zones more than 11 times — once their occupation continued for three months. Since the fall of 1988, more than 300 Innu — men, women and children — have been charged with mischief and/or trespassing. Many have been sent to prison.

Rose spent three months in the Stephenville Correctional Centre for Women last year. It was three months spent away from her four children. Martha Hurley, was also in prison. "It was very hard for us to depart from our families but we don't have a choice... My memories of my two-year old boy will always be in my heart; during the first protest I held him in my arms and ran in the gate. It gave me strength to have him in my arms and I was protesting just because of him," Martha says.

In a small way, it seems, the Innu women's struggles have paid off. In May of this year, NATO rejected an appeal to station a new NATO base in the heart of Innu territory. There are no plans, however, to diminish the present level of military activity. The low-level flying and the bombing continues. The Innu women, however, are equally determined to fight.

Says Martha: "We will continue our struggle as long as we are not assured that our children and grandchildren will ever have to hear again those monsters in the sky. Although the road of our struggle is not easy, we will continue to fight."

(Pam Mayhew is a member of the NATO Out of Nitassinan Campaign. Katherine Ings and Rita Parikh are Ottawa-based MATCH members.)

Reprinted from MATCH news, Summer 1990

UN environmental 'Green Berets' proposed

BY PRATAP CHATTERJEE

A UN committee has proposed the establishment of UN "Green Beret" environmental relief teams made up of the military forces and equipment of member countries.

The proposal is one of the recommendations of a report on the potential reallocation of military resources, prepared by a group of experts commissioned by the General Assemble last December.

Maj-Britt Theorin, chair of the Swedish disarmament commission and of the committee which wrote the report, said that the Swedish government had indicated informally that it would back the proposal, which will be presented to the next session of the General Assembly.

Theorin made the results of the study public at an NGO briefing on military and the environment, just before making an intervention on the subject at Monday's plenary meeting. She suggested that the recommendations form part of Agenda 21.

"We suggest that member countries make a record of what they can turn over to the UN to protect the environment," said Theorin. The study also recommends that the UN act as a clearing house for exchange of information on national experiences of the environmental effects of military development, production and use.

And it encourages governments to retrain their military forces to monitor environmental abuse and provide rescue and relief facilities.

Military production and use is considered to be one of the biggest threats to the environment, even in peacetime, particularly because of its use of chemical and radioactive material.

The expert group says, however, that military surveillance and rapid deployment capabilities could be used to combat natural disasters.

The Germans use their air surveillance technology to detect oil spills while tanks have been converted to detect air and soil pollution. The Chinese army has been used for tree planting and forest protection.

NGOs voiced several concerns about the proposals. Cindy Milstein of the US-based Left Green Network said that the proposal could be used to create "environmental superpowers."

"The US used their weaponry to decimate the Iraqi environment and now they are trying to make a profit by cleaning up the environment in Kuwait" said Milstein.

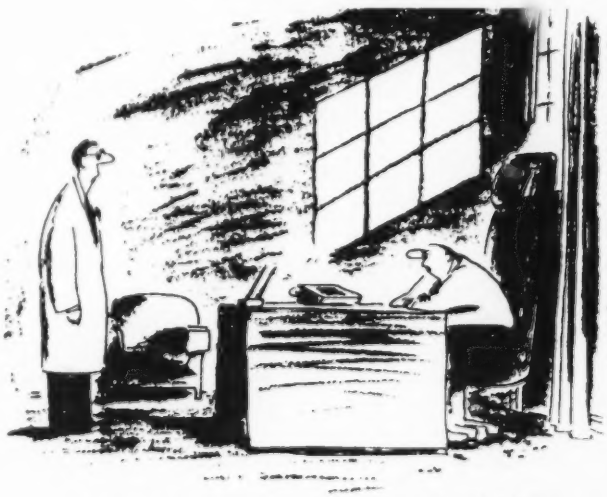
In reply, Theorin stressed that the UN would be the focus of the environmental taskforce. She also said that the proposal would be made to the General Assembly rather than the Security Council, so that developing countries would have more of a say in implementing the resolution.

"We have to make sure that the conversion is done now rather than later to minimise its economic impact. This is the typical Swedish way to prepare and plan to prevent unemployment. We must avoid the US way of trying to sell weapons till you can't sell anymore and then stop and try to convert." she said.

Godfrey M'Mwereria of the Kenya-based Southern Networks for Development was still critical that the proposal did not go far enough: "Your approach is too technical. You don't take into account the values, politics and conscience of military orientation."

Jonas Olsson of the Swedish group Cooperation for Peace suggested that if the Swedish government was seriously backing the proposal, it could start by reallocating army facilities to the restoration of the 20,000 acidified lakes in its country.

Reprinted from Crosscurrents, 28 August 1991



Reprinted from Bulletin of Atomic Scientists, April 1991

"I'm assigning you to work for the betterment of mankind — you never were any good at making bombs."

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THE UNCED FARCE

By Martin Khor Kok Peng

SHOCKINGLY ABSENT from preparatory negotiations for the meeting of world leaders at the United Nations Conference on Environment and Development (UNCED, also known as the "Earth Summit") in Rio in June are proposals for the international regulation of big business and multinational corporations to ensure that they reduce or stop activities that are harmful to human health, the environment and development.

Documents related to Agenda-21, UNCED's action program, refer to the role of business and industry only in the context of strengthening the rights of major groups, such as women, youth, indigenous people and non-governmental organizations. UNCED is treating corporations as entities which should be relied on to help protect the environment, rather than ones whose activities are destroying the environment and should be strictly regulated.

The UNCED Secretariat is emphasizing the adequacy and willingness of big business to regulate itself. This is dramatically manifested in the Secretariat's promotion of the Business Council for Sustainable Development (made up of corporate representatives) at a time when the UN Center for Transnational Corporations (UNCTC, the main UN agency responsible for monitoring multinational corporations) has been "restructured" into something called the Transnational Corporation and Management Division.

At an UNCED preparatory meeting in New York in April, two proposals for corporate environmental accountability were withdrawn. Sweden withdrew a proposal calling on corporations to adopt full-cost environmental accounting and the G-77 grouping of Third World countries and China dropped a proposal calling for the establishment of a framework for global corporate environmental management.

Instead, participants at the New York meeting approved several proposals which look to business as a protector of the environment. Among them was a call to seek the cooperation of multinationals in exploring the use of market mechanisms in the energy, transport, health, forestry and other sectors.

UNCED should be moving in exactly the opposite direction, seeking to rein in, not unleash, multinational corporations.

For the UNCED to be more than a charade, it should adopt measures such as the following:

- Agenda-21 should contain proposals calling on multinational corporations to publicly disclose information related to the environmental, health and safety, social and developmental effects of their activities.
- Agenda-21 should include proposals to establish multilateral institutions to monitor, analyze and regulate the activities of multinationals.
- UNCED should reaffirm the rights of states to regulate the entry and operations of multinationals.
- UNCED should send a message to the General Agreement on Tariffs and Trade (GATT) negotiators and to other forums that the rights of multinationals are secondary to the rights of the public and states to regulate corporate activities on behalf of environmental protection and development interests.
- Agenda-21 should call for the restoration of the UNCTC and the strengthening of other agencies' efforts to monitor multinationals.
- Agenda-21 should include proposals for international mechanisms to make multinationals liable for compensation and other payments for the environmental, safety and health effects of their operations.

Reliance on "market forces" and the failure of self-regulation are responsible, in large part, for the world environmental crisis. The time has come for greater and more effective monitoring and regulation of multinationals, the economic agents whose present and future behavior will determine the fate of the earth.

UNCED should be moving in exactly the opposite direction, seeking to rein in, not unleash, multinational corporations.

Multinational corporations are the entities primarily responsible for the global environmental crisis. For example, multinationals in the petroleum, auto, chlorofluorocarbon (CFC), electricity-generating and energy-intensive metals industries and in agriculture account for roughly 50 percent of all greenhouse gas emissions, according to a recent UNCTC study.

There is a wealth of evidence showing that the sort of self-regulation advocated by the UNCED Secretariat is not an adequate substitute for public regulation of industry. It is also clear that individual governments, many of them economically smaller than the multinationals, cannot sufficiently regulate business on their own, especially in an atmosphere of intense economic competition, where companies pit countries against each other to lower environmental, health and safety standards.

Reprinted with permission from Multinational Monitor (May 1992), PO Box 19405, Washington, DC 20036. Individual subscription $25/year.

Tread gently on the earth

The UN's 'Earth Summit' in Brazil is a chance for the North to listen and learn from the South. Here's what some leading environmental activists from the South are saying.

Vandana Shiva: GLOBAL BULLIES

THE MOTTO for the North at the UN Earth Summit and other global negotiations seems to be: 'What is yours is mine; what is mine is mine.' This lopsided view of a common future is made easier by the idea of the 'global'. Through its global reach the North exists in the South. The South, however, exists only within itself. The South can only exist locally, while only the North exists globally.

The ordinary Indian woman who worships the *tulsi* plant worships the cosmic as symbolized in the plant. The peasants who treat seeds as sacred see in them their connection to the universe. Treading gently on the earth becomes the natural way to be. Demands for a planetary consciousness are made on the self, not on others.

The moral framework of the 'global reach' of the North is the opposite. The G-7 group of rich countries can demand a forest convention that imposes international obligations on the Third World to plant trees. The Third World cannot demand of the industrialized countries a reduction in their use of fossil fuels and energy.

'Global ecology' at this level becomes a moralization of immorality. It is empty of any ethics for planetary living. It is based not on concepts of universal solidarity but on universal bullying.

The reversal of ecological decline involves strengthening local rights. The two central planks of local environmental rights are the right to information and the right to prior consent. Any activity with potential impact on the local environment should have the consent of local people.

The 'global' must cede to the local, since the local exists within nature while the 'global' exists only in the offices of the World Bank, the International Monetary Fund and multinational corporations. We should not worry about how to get the last tribal to sit in on World Bank decisions in Washington. But we do need to ensure that no World Bank decision that affects the resources of tribals gets taken without their prior informed consent.

The Earth Summit will be a failure if it does not create conditions for an earth democracy. An earth democracy cannot be realized so long as there is global domination by undemocratic structures. It cannot be realized on the basis of an anthropomorphism that excludes the rights of non-human nature. And it cannot be realized if planetary survival is used to deny the right to survive of those who are poor and marginal today because they have borne the accumulated burden of centuries of subjugation.

Vandana Shiva is director of the Research Foundation for Science, Technology and Natural Resources Policy, Dehradun, India.

Martin Khor Kok Peng: NERO'S CHILDREN

IS THE SOUTH using the environment as a bargaining chip, a leverage, to get more aid from the North? Is the South saying: 'If you don't give us money, we will chop down all the trees and poison the atmosphere just to spite you?' We don't think so.

The message is this: 'We are defending the last vestiges of our sovereignty over resources. This is a last chance for the people to survive and live with dignity.'

If Northern politicians are afraid to advise their public to buy fewer cars and use less oil, can a Southern government really be expected to tell its people to tighten their belts further and make room for two 'structural adjustments': one forced on us by external debt, the other by new ecological imperatives?

What we are talking about ultimately is survival, humanity, dignity and democracy. As national development agencies we in the South have spent a lot of our energy broadening the democratic spaces in our national societies, removing the barriers to people's participation, helping social movements regain their right to land, to good health and adequate nutrition, to safety, housing and a sustainable environment.

We now realize that the fight for democracy must also be extended to the international arena, where the lack of democracy is so obvious. International democracy is needed just as much as national democracy. Until there are moves towards a more balanced world economic order there is little hope for any genuine partnership on environment.

There must thus be a review of the behaviour and performance of the major economic players, including the transnational corporations, the international banks, the World

Bank, the International Monetary Fund (IMF) and the General Agreement on Tariffs and Trade (GATT). These institutions, which make the decisions that affect so much of our lives, must be made much more accountable to the public.

Local communities in our countries must also have the opportunity to participate. The public has this right because it is the public that suffers the consequences if something goes wrong — whether it be the Bhopal residents dying from chemical poisoning or the more than 100,000 farmers dying from pesticide poisoning annually, or the hundreds of millions of people suffering the social and economic effects of structural adjustment policies imposed by the World Bank and IMF.

Environmental and economic issues have to be resolved simultaneously. The operating principles must be ecological sustainability and social equity. With a fairer North-South balance non-governmental organizations (NGOs) in the South can encourage people's participation in socially just and environmentally sound development. The North has to change within itself, and the battle for that 'adjustment' will be as difficult as it is necessary.

The barricades on the road to Rio can be removed, and the fires dampened down, if the North starts talking economics and the South responds more to ecology. Otherwise, history will remember the leaders of today as we remember Nero, for fiddling when there were more important things to be done.

Martin Khor Kok Peng is Managing Editor of Third World Resurgence magazine.

Charles Abugre: DOLPHINS, ELEPHANTS & PEOPLE

WE LIVE IN COUNTRIES where people are dying in larger numbers than dolphins or elephants; where indigenous and sustainable lifestyles are being disrupted by loggers or large-scale farmers or miners; where poor and indigenous peoples face the manipulation of their production systems into greater and greater dependence on an unfair world market; where the social and traditional safety nets of people are being eroded by a market economy that is unreliable and capricious. Therefore, in our view, the urgency of saving the world's environment lies in saving human beings from abject poverty alongside their natural resources.

The central issue is the empowering of communities and the poor to take control over their own resources. We ask the North to strengthen its own social security systems for the poor and reduce income disparities worldwide. We ask the South to give priority to relieving poverty and redistributing land and assets in favour of the poor.

Internationally we call for a review and revival of the UN General Assembly's declaration for a new international economic order, programmes to reverse the declining terms of trade of the Third World, to reverse resource flows, to regulate transnational corporations and to democratize multilateral financial institutions like the World Bank. We ask that the World Bank's interference in national and regional policy-making be curtailed.

Charles Abugre is an economist from Ghana

COICA: WISE MANAGERS

MORE THAN 500 years ago, before the United Nations, before the Earth Summit or even ecology as a concept existed, the indigenous peoples knew already how to explore and conserve their natural resources. And we shall continue doing so for another 500 years. We hope that the Earth Summit will take this into account and include in all its resolutions the priority of giving indigenous peoples land rights.

We also claim our rights to control our own resources and apply our traditional practices of wise management. The two million members of the indigenous peoples of South America's Amazon basin, representing more than 500 distinct cultures, have been using tropical forests in a sustainable way for thousands of years. We will go on doing so, and any state or international policy that aspires to do the same must co-ordinate with the indigenous peoples.

Unfortunately there has been very little co-ordination between the UN organizers of the Earth Summit and indigenous peoples. So-called 'participation' usually remains in documents kept on files. We do not want impositions and conflicts regarding the Earth Summit's conventions, nor national laws and projects which we do not understand and cannot support.

We, the indigenous Amazonians, talk with nature with or without conventions, with or without financial funds. With this historical and moral authority we call on governments and the United Nations system to work with us to avoid the destruction of the unity between Amazonia and its indigenous peoples.

Statement by the Coordinating Body for Indigenous People's Organizations of the Amazon Basin (COICA).

Reprinted from New Internationalist, April 1992
Originally appeared in "The battle for the Earth Summit", Third World Resurgence, October/November 1991

The threat of success

Dear Editor,

I don't know who leaked the attached memo, but it may interest the readers of Development Forum.

Yours sincerely,
James Robertson

Your Satanic Highness,

I have the honour to report an event which threatens our plan for the humans to destroy the Enemy's creation — of which they themselves are part.

They are now discussing their "common future" at an "Earth Summit". This unprecedented meeting comes precisely 500 years after the modern era began — I refer, of course, to Columbus' famous voyage. It could mark the start of a new era, and a new more sustainable and equitable direction of human development and progress.

How should we assess this threat? There are, I shall suggest, three possibilities.

If it were to succeed, the Earth Summit would have to achieve a compact along the following lines.

• The rich countries of the so-called "First World", led by the Group of Seven, would have to commit themselves to the new direction of progress. This would concentrate on improving their people's quality of life while reducing their per capita ecological impact to a level sustainable by an eventual world population of, say, 10 billion people. It would, for example, call for a cut of more than four fifths in present per capita energy consumption over the next 20 years.

• The formerly "socialist" and the "less developed" countries of the Second and Third Worlds would have to accept that they can never attain today's First World per capita levels of material throughput, pollution and waste. They too would have to commit themselves to the new, post-Euroamerican, people-centred, ecologically sustainable path of development — often including population stabilization policies and an enhanced development role for women.

• In their own self-interest, First World countries would have to commit themselves to effective technical and financial support for sustainable development in the Second and Third Worlds, recognizing that ecological destruction there damages the global ecosystems on which their own future depends.

• They would also have to recognize their huge development debt to Third World countries, arising from the damage the First World has done both to the global environment and to the development prospects of other peoples over the last few hundred years. They would have to agree to write off the outstanding financial debts of the Third World as part of the new global compact for sustainable development.

• Agreement would also be needed to restructure the United Nations system, to:

(1) set up regular annual procedures for negotiating monitoring and reporting progress on national and global policies for sustainable development;

(2) bring world economic institutions — notably the International Monetary Fund (IMF), the World Bank and the General Agreement on Tariffs and Trade (GATT) — within that policy framework, together with the United Nations Environment Programme (UNEP) and the United Nations Development Programme (UNDP), under the democratic supervision of the United Nations General Assembly; and

(3) involve representatives of citizens (non-governmental organizations, or NGOs as well as governments the further democratization of these and other United Nations procedures.

• Finally, the Earth Summit would have to question prevailing economic orthodoxies, such as:

(1) the desirability of conventionally measured economic growth;

(2) the assumption that conventional free-market capitalism is the only feasible alternative to state socialism, and

(3) the assumption that conventional free trade is the only alternative to old-fashioned protectionism.

The first of the three possibilities is that the Earth Summit will be a resounding success, leading to the effective implementation of a global compact on these lines. That is the worst-case scenario from our point of view. Fortunately, it is also the least probable. First World and multinational business lack the vision to treat the recent collapse of the socialist economies not as "the end of history" — which gives conventional capitalism a free run into the future — but as the first phase in a larger process of global transformation.

Another, rather more probable, scenario is that the Earth Summit will be a resounding failure. But, again, it is not in our interest to have the incapacity of today's official world leadership too clearly exposed. Too many people are already aware that human hopes for the future lie with the worldwide network of citizens' movements and NGOs which has coalesced around the Earth Summit and challenged today's established power structures.

The most probable scenario, and the best one for us, is that the Earth Summit will be a cosmetic success — a spate of fine words and ideas without the political will or practical means to implement them, which will lull the world into thinking that all necessary action is in hand. I and my colleagues here will continue to work for this outcome, with the willing help of many of the humans involved.

I will report further developments in due course. Meanwhile, I have the honour to remain your Satanic Highness' Intelligence Co-ordinator on Planet Earth.

B.L.Z. Bubb

James Robertson's latest book is *Future Wealth: A New Economics for the 21st Century*, (Cassel, London; Bootstrap Press, New York).

Reprinted from Development Forum, May-June 1992

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SOLUTIONS

Women's Success in Environmental Management

Women's successes in solving environmental problems provided an unusually up-beat theme for a conference on the global environment. In contrast with the doom-and-gloom of so many environmental meetings, the Global Assembly on Women And The Environment held in Miami (4-8 November 1991) threw up stirring success stories. These showed what women can do in their communities, their countries and right around the planet.

Graphic: Tribune

'All these environmentally-sensible and useful accomplishments were chosen because they are affordable, repeatable and sustainable.' points out Joan Martin-Brown, Assembly Coordinator and Chief of UNEP's Washington Office.

She adds that the most encouraging part of the exercise was that the achievements were carried out at the grassroots level by ordinary citizens.

'Another virtue of the Global Assembly', says Martin-Brown, 'is that it throws the spotlight on environmental success when everyone is constantly being told that an environmental Armageddon is just around the corner.'

The assembly was attended by 525 people, and provided 211 case studies of practical environmental achievements by women. The participants called for women to be consulted and involved in decision making which affects the environment they live in. For example, especially important for women in the developing world, is access to clean water. The Assembly called for the designers of all water supply and sanitation systems to be required to consult women who live nearby, because they are the ones who are the primary users of water in the home.

They declared that, 'Too few women have been involved in decision making with regard to policies, programmes or funding for the environment, despite the international target of 30 percent of women in leadership positions by 1995, and equal representation by women and men by the year 2000.'

What women have achieved

In India, for example, in the state of Andhra Pradesh, Vasanth Kanibera observed the desperate environmental and social situation around her. The degradation of productive land had led to the erosion of topsoil, the choking of water drainage was causing salinity, loss of food crops and increasing unemployment in the villages. Led by Vasanth Kanibera, village-level groups decided to pool their limited resources, collectively lease degraded lands and revive them through traditional farming. This approach was instead of heavily-subsidized, irrigated, market-oriented, mono-crop agriculture. As no bank would lend the women farmers any money, a development society offered an initial loan.

The project grew to 400 women in 20 villages and, in three years, 700 acres of land had been restored to productive use. More land is being improved every year. The women make sure that there is no loss of topsoil, reduction in crop diversity or waste of rainwater.

In the Soviet Union, in 1986, the Ministry of Energy and local authorities decided to build a huge, 200-metre-high electric dam on the Katun River in the Altai Mountains. They hadn't counted on Maria Cherkasova, a biologist and journalist. When she realized that the dam would flood a beautiful historic wilderness, destroy wildlife, erode fertile land and, by leaching mercury and other toxic substances out of the rocks, pollute the drinking water of millions of people, she spread the word, and small, militant Committees for the Salvation of the Katun River were created in six cities. They soon won the support of thousands of citizens who started protest marches, signed mass petitions and organized meetings and letter-writing campaigns. Construction on the dam has been halted — at least for the moment.

Other consequences of the campaign are just as important. It raised nationwide Soviet consciousness about environmental issues, taught those involved a lot about environmental activism and led to the creation of an umbrella organization of 200 Soviet environmental groups, the Socio-Ecological Union, under Maria Cherkasova's leadership. The Union has established contacts with international organizations and gone on to lead a wide range of successful environmental campaigns and activities.

In Brazil, a metalurgy factory operated for two decades without proper emission controls in the economically-depressed northeast region of Bahia. As a result, the area's cadmium levels were the highest in the world, and lead levels among the worst. Hardly surprising, since the plant management admitted to having emitted 400 tonnes of cadmium, and

even greater quantities of lead, into air and a local river. Worse, the factory offered free 'dret' (powdered solid wastes left after lead extraction and containing 21 percent cadmium) to poor families for paving home gardens, back yards and roads. They also distributed, free of charge, used filters from factory chimneys to be used in homes as bedspreads and rugs. Ten percent of the children living nearby were considered highly intoxicated from lead and cadmium poisoning and another 17 percent at risk. Intoxication causes brain and kidney damage.

It took a woman doctor, Tania Tavares, to do something drastic about this scandalous situation. Under her leadership a team of scientists and students of chemistry, biology and medicine from the University of Bahia researched the problem and gave a report to local authorities, proposing guidelines and solutions.

The Bahia affair was the first to receive widespread media attention. Factory management was obliged to develop more environmentally-acceptable emissions of lead and cadmium, and to recognize their responsibility for medical care of poisoned children and adults. While lead levels were reduced by about 38 percent and cadmium levels by 68 percent, the local population still shows high levels of both metals. Dr Tavares and her team are pursuing their investigation.

Tuna trawlers in the eastern tropical Pacific deliberately set their nets on dolphins because they know that yellowfin tuna swim underneath them. In this heartless manner more than six million dolphins have been unnecessarily massacred. Brenda Killian, a leader of a San Francisco environmental group in the United States, Earth Island Institute, was determined to stop the massacre.

In 1988, an institute biologist was hired on a tuna fishing boat and videotaped dolphins drowning in tuna nets. Television news programs showed the images. The Institute's Dolphin Project called for a consumer boycott of tuna fish and ran newspaper advertisements urging H. J. Heinz, the largest producer of canned tuna, to halt the dolphin massacre. Heinz, which sells Starkist brand tuna, announced in April 1990 that it would no longer purchase tuna from fishing boats that used techniques endangering dolphins. Bumble Bee and Van Camp, which market Chicken of the Sea, declared the same day that they, too, would no longer buy 'dolphin-unsafe tuna'.

While heading a global monitoring programme, Brenda Killian discovered in Thailand that Unicord, the parent company of Bumble Bee, had purchased 2200 tonnes of tuna that involved the killing of dolphins. Earth Island ran full-page advertisements in major American newspapers accusing Bumble Bee/Unicord of failing to stop purchases of 'dolphin-unsafe tuna'. There was also substantial media coverage. Bumble Bee/Unicord finally promised to live up to its pledge, and today all three companies appear to be complying with their agreement to purchase, process and sell only dolphin-safe tuna. The campaign has already saved the lives of hundreds of thousands of dolphins.

In Kenya, soil degradation and deforestation created an acute shortage of wood, the major source of energy (in the form of fuelwood and charcoal) for over 90 percent of the rural population and for low-income urban groups.

Out of the grassroots came the Green Belt Movement of Kenya, with tree planting as its main activity and the focal point for bringing other environmental issues to the attention of the public and of decision makers. In addition to the founder, Professor Wangari Maathai, one of its most effective leaders was Professor Beaman Mbaya. From a modest beginning in 1977, Green Belt has become a mass environmental organisation of 1.5 million members and 50 000 activists. They have set up more than 1000 tree nurseries and, in the past 10 years, planted over 7 million trees, with a survival rate of 70-80 percent. Millions of tree seedlings have been given to small-scale farmers, schools and churches. Women are beginning to harvest fuelwood from their own trees, and their fruit trees are bearing fruit. Some young people have found employment. Fuel and water have become more readily available for domestic and public uses.

In coming together to plant trees, Kenyan women have dealt with their environmental concerns that involve national development. And their Green Belt movement has spread to 12 African countries.

Further reading

THE WORLD'S WOMEN 1970-1990

A readable and comprehensive survey of women's conditions around the globe. The book is not simply the arid data which characterizes so many publications by international organizations, but analyses and informs the reader. Former UN Secretary, General Javier Pérez de Cuéllar, concluded from the book that despite 'some improvements for women over the past 20 years, the majority still lag far behind men in power, wealth and opportunity.'

The book's readability and innovative writing style provide answers to basic questions about the role and conditions of women around the globe.

US$19.95 from: Sales Section, United Nations Publications, Room DC2-853, United Nations, New York, NY 10017, United States

For copies of the nine-page final report from the Assembly on Women and the Environment, and for additional information, contact: Joan Martin-Brown, UNEP Washington Office, 1989 E Street N.W., Washington D.C. 20006, United States, Tel: (202) 289 8456, Fax: (202) 289 4267

Reprinted from Our Planet, V4, N1, 1992

MY MOTHER

My name is Sinit. I come from Bangkok, Thailand. Currently, I am a graduate student at the Faculty of Environmental Studies, York University, Ontario, Canada. I came to Canada to learn how to be an environmentalist, and I am learning about things like ecofeminism, sustainable development, resource management, energy conservation, and "reduce-reuse-recycle".

My mother, Ganda, lives in the middle of the city of Bangkok, Thailand. She came from a village in the south 20 years ago. She attended school through Grade 2. She has never had a job outside of her home and family, which she has looked after for 58 years.

My mother knows all about ecofeminism, sustainable development, resource management, energy conservation, and "reduce-reuse-recycle". She just didn't know they were called those things. In her roles as agriculturalist, home economist, teacher/ entertainer, healer, energy conservationist and all-round resourceful person, **she was my first environmental educator, and here is why I say this...**

I realize now that after travelling 10,000 miles to go to graduate school and do environmental studies, much of what I am learning I have already learnt from my mother. I must go home now and tell her that.

ALL-ROUND RESOURCEFUL PERSON:

My mother uses banana leaves and coconuts, not plastic. Banana leaves become food containers, food wrappers, string, and baskets. Coconut husks become scourers, and mosquito repellant when burnt. Coconut shells become bowls, planters, and soup ladles. She just doesn't believe in plastic at all.

RESOURCE CONSERVATIONIST:

She recycles everything, making good use of all kinds of "waste" materials. She prefers natural energy sources. Coconut shells, newspapers and dry leaves become fuel for the stove. A bucket of water washes the baby, the clothes, and the floor. The sun dries her fish, her chilis and her fruit.

AND ME

AGRICULTURALIST:

She grows bananas using soil fertilized with burnt grass, leaves, scraps, etc. All of the fruit and vegetables we eat are grown in small jars and pots around the house and in the back yard. "We should use everything over and over," she says. "And we must conserve space."

HOME ECONOMIST:

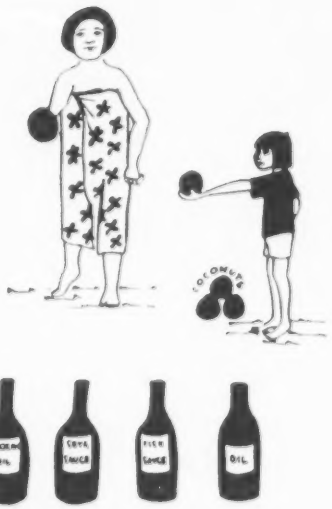
She uses materials that are all around her as much as possible...Coconut husks become scouring pads, ashes are dishwashing powder, leaf stems tied together are brooms, bamboo stems are mop handles, fruit pickers and a host of other things.

HEALER:

Leaves, herbs and spices grown in pots around the house are used in many medicinal ways. For instance, here is her prescription for a cold:
Take a handful of tamarind leaves, some red onions and place them in boiling water. Inhale the steam. When the water has cooled, bathe yourself in it. Place the leaves and onions on your head.

TEACHER/ ENTERTAINER:

From her mother and grandmother, and by herself, she has learnt how to make children's toys like bowls, balls, animals and birds, mostly with products from the banana and coconut trees. With these toys, and a 50+ yr-old slate, she teaches, plays with, and entertains her children and grandchildren.



Reprinted from the Tribune, Sept. 91, with the permission of the International Women's Tribune Centre (IWTC)

50 DIFFICULT Things
You Can Do To Save The Earth

Compiled by Gar Smith

1. Bury your car.
2. Become a total vegetarian.
3. Grow your own vegetables.
4. Have your power lines disconnected.
5. Don't have children.
6. Restrict the population of motor vehicles.
7. Don't build cars.
8. Stop building roads.
9. Replace roads with homes, parks, and gardens.
10. Halt weapons production and exports.
11. Stop the sale, distribution, and export of cigarettes.
12. Send money to Brazil to provide urban jobs for impoverished workers now forced into the rainforests.
13. Blockade a lumber truck carrying old-growth trees.
14. Spend a month tree-sitting.
15. Try to live within the world average income ($1,250 a year).
16. Cut up your credit cards.
17. Unplug your television.
18. Undertake a "conservation Sabbath" — one day a week without consuming electricity or fuel.
19. Fast one day each week and send the money saved on food to help feed the hungry.
20. Adopt a homeless person.
21. Raise the minimum wage to a survival income.
22. Enact a maximum wage law.
23. Tie politicians' salaries to the average working wage.
24. Replace majority rule with proportional representation.
25. Replace the Electoral College with direct democratic elections.
26. Abolish the CIA and the National Security Act of 1949.
27. Pass a nature amendment to the U.S. Constitution.
28. Oust presidential adviser John Sununu.
29. Plant one new tree every day.
30. Go to jail for something you believe in.
31. Don't own pets.
32. Allow all beef-producing domestic cattle to become extinct.
33. Redirect the military budget to restoration work; convert weapons factories to peaceful research; retrain soldiers for ecological restoration.
34. Remove the U.S. Forest Service from under the Agriculture Department; place USFS, the Bureau of Land Management, and the Fish and Wildlife Service under the Environmental Protection Agency.
35. Consume only products produced within your bioregion.
36. Don't eat anything that comes in a package.
37. Don't buy anything that comes in a box.
38. Require operators and owners of nuclear power plants to live within one mile of the site.
39. Mandate federal recycling and institute a refuse tax on solid waste.
40. Pipe polluted water back into the water supplies of the companies that do the polluting.
41. Don't own anything that runs on batteries.
42. Hand over all excess packaging to a store manager on each visit to the grocery store.
43. Travel by bus, never by air.
44. Stop using toilet paper and Kleenex; use washable cloth.
45. Extend the life of your wardrobe by learning to make and mend your own clothes.
46. Give money to every single panhandler you meet.
47. Democratize your workplace; start a union or a collective.
48. Learn to farm.
49. Liberate a zoo.
50. Ask your boss if you can take a day off to work on healing the planet ... with pay!

Reprinted from Green Business: Hope or Hoax? © New Catalyst.

Simply... NINE WAYS TO HELP SAVE THE PLANET

1. DISCOURAGE PACKAGING

NEXT time you are out shopping try this test: the less essential a product is, the more packaging it will have. Compare, for example, a box of chocolates with eight layers of wrapping, to a bag of rice with only one. Over-packaging adds about ten per cent to our weekly shopping bill. It serves no real purpose and eventually we have to pay for it to be taken away. It also uses up scarce resources; most plastic is made from oil and does not biodegrade. As a first step you might refuse the plastic bags that are thrust upon you at the supermarket check-out and use boxes to carry home the food.

2. AVOID POISONS

EVERY day there is another scare about some product damaging our health. The easiest poisons to avoid are those designated as such. Weedkillers and pesticides work their way up the food chain from plants, through insects and birds, into your family – which is a good reason to keep your garden organic. Bleaches are among the most polluting of household cleaners. As well as being a health risk, they carry on killing organisms in rivers long after they leave your home, so it is best to minimize the quantities used. The environment-friendly bleaches now on sale are better than ordinary bleaches since they contain no chlorine – but the substitute, hydrogen peroxide, may still be harmful.

3. SET STANDARDS

DON'T be satisfied with buying something because it is described as 'green'. You need to know exactly what you are getting. How will it affect the environment and you? What is it made from? You have the right to accurate, informative labeling of products so that you can make your own decisions about what to buy. That means lobbying governments, supermarkets and manufacturers. In West Germany shoppers look for a Blue Angel on the label before they purchase. Then they know that the item conforms to a given set of environmental standards. The scheme has recently been improved to include criteria for judging a product at all stages in its life from how it was made, to its impact on the environment after it has been sold.

Illustrations: Chris Utley

4. EAT LOCAL

TAKE one of your favourite cereals and count how many ingredients are listed on the packet. The more there are, the more wasteful its production process has been. The stabilizers, additives, colourings and flavourings in processed food are chemicals produced in factories. Most have no nutritional value and many are harmful to our health; they are included to increase the shelf-life and 'attractiveness' of the product. Likewise the pesticides and weedkillers used in large-scale crop-farming kill plants and wildlife and pollute the atmosphere. The residues accumulate in our bodies and can cause cancer and birth defects. Fresh food grown organically without using chemicals is better for your health. It also tends to be grown locally so that less fuel is wasted on transporting it. Organic food is still expensive – but the more we buy it, the cheaper and more widespread it will become.

6. SAVE ENERGY

THERE is no hazard-free way of producing large quantities of energy, so we have to conserve it. Insulating your loft, fitting double-glazing, making your doors draughtproof and switching off lights and fires when you don't need them save energy – and money too. You can save up to 30 per cent of your heating costs by fitting a time-clock and a thermostat to your boiler. Low-energy using fridges and washing machines have recently appeared on the market and are cheaper to run than ordinary ones. Heat recycling pumps use little power themselves and improve heat distribution, reducing the amount of energy needed to heat the house. Best of all, you can fit your home with solar panels (see *Action*, Page 25) that will supply at least some of your heating needs.

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5. PENALIZE POLLUTION

THE deadly pollution potential of many manufactured goods is now being recognized. But we can all do our bit to eliminate polluting products from the market. In a society dominated by consumerism, every buying choice we make is a political act – by choosing to buy environmentally friendly cleaning fluids and powders, avoiding aerosols and using unleaded fuel, we are not only minimizing our own impact on the environment but also registering a protest. This forces companies to see that there is a growing demand for genuinely 'green' goods. But we should also try to find out what kinds of pollution a product causes during its manufacturing process. Some items are harmless in themselves, but cause enormous environmental damage to make.

7. RECYCLE WASTE

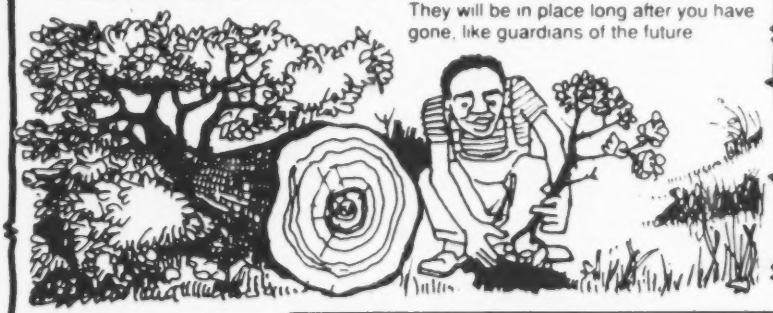
WE produce more garbage today than ever before. Recycling is better than disposal so before you throw anything away think how you could give it a second life. Many supermarkets now have bottle-banks, but returnable bottles are better still because they save natural resources and energy – manufacturers need to be pressured into recognizing this. Old fridges and cookers should be taken to second-hand shops or civic amenity sites to be refurbished instead of dumped. Organic household waste can be composted to make garden fertilizer. And many motorists are still unaware that used sump oil from do-it-yourself oil changes can be recycled if returned to garages.

8. RESEARCH RAW MATERIALS

IT is important to find out what raw materials a product uses. How were they mined and where did they come from? Did the table and chair in your home involve rainforest destruction? If they are made of mahogany, the answer is 'yes'. We should only buy woods that have sustainable sources, look first for furniture in second-hand shops, and give away old household items to be sold by charities. Aluminium cans are made from bauxite which is often dug up in tropical forests. They use the equivalent of half the can full of oil in their production. The recycling of these is well established in Australia, Canada and the US, all of which re-use more than 50 per cent. But in the UK more than 90 per cent of all aluminium cans are still thrown away – collect yours together and take them to a scrap-metal dealer.

9. PLANT TREES

EACH of us consumes the equivalent of between one or two trees each year in paper-use alone. The least we can do is plant a few trees in return. Stick to native species to ensure the tree is suitable for the soil in your area. As well as being aesthetically pleasing, trees absorb carbon dioxide which is thought to be making holes in the ozone layer. They also harbour wildlife and help prevent soil erosion. They will be in place long after you have gone, like guardians of the future.



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ACTIVITIES AND IDEAS

This reading book is divided into subject headings dealing with food-related issues. The Table of Contents gives a brief overview of each article in the section. We have designed the activities to relate to these different sections.

These activities are organized in three ways. First are those entitled "To the Teacher", which are ideas for teacher-led lessons. Second are "Student Activities", those relating to specific articles and they are located under the title of the article in question. Finally, there are assignments developed for use at the end of a section, called "Additional Activities", where the student has the opportunity to "tie together" the information studied.

ENVIRONMENTAL IDEAS AND PROBLEMS

TO THE TEACHER

The students will already be informed and aware about the issues presented in this booklet. Because there is so much media coverage on environmental issues, self-directed studies around topics of interest to students or topics particularly pertinent to the community would be valuable. The articles in each of these sections would be a good starting point for research projects.

The term "sustainable development" has different meanings to different people. Work with students to analyze this term. If a phrase is used too loosely, does it lose its meaning? How might a businessperson interpret this phrase? an environmentalist? a farmer?

It is essential to provide students with the skills to formulate their own opinions. We have tried to offer a variety of viewpoints on the issues; students can compare and contrast these points-of-view. Another place to look for a balance of opinion is when you ask guest speakers to your class.

STUDENT ACTIVITIES

Article 1. *The State of the World Environment, 1991* (p. 1)

Make a poster depicting the information in this article. Consider using charts or graphs to present your information.

Article 2. *The Road to the Earth Summit* (p. 4)

Choose the one event you feel is most important on this "road" and research it further, indicating why you chose this event. Present your information to the class.

Continue the "road" to end with the Earth's environmental health. How long do you think it would take?

Article 3. *Diet for a Small Planet* (p. 6)

"People would have to learn the meaning of the word 'enough'. What does this quote mean to you? Make a list of the things that are essential in your life. Does every citizen in the world have access to these things? Look at your list again, and indicate which are "needs" and which are "wants".

Article 4. *The Illusion of Progress* (p. 7)

Define the word "oxymoron". Why does the author feel that "sustainable development" is an oxymoron? Why is the article entitled "The Illusion of Progress"?

Do you think sustainable development is possible? Define what YOU think of as "sustainable development".

Article 5. *Science and Sustainable Development* (p. 7)

What do these three laws have to do with sustainable development?

Come up with one more law about the earth that you believe to be true IN ALL CASES! (This may not be as easy as it seems!)

Article 6. *Can Science Save Us?* (p. 8)

Write an essay analyzing this question.

Article 7. *The Fridge, the Greenhouse, and the Carbon Sink* (p. 9)

This article takes the position that the North is responsible for most of the world's environmental problems, but are expecting the South to take half the blame. Write two letters; one from a Northern leader asking the South for help with these issues, and one from the Southern leader responding. Use quotes and information from these articles.

Debate: If a country is not using its emission quota, should another country be able to buy the right to pollute from them?

Article 8. *Should the rights of humans take precedence over the rights of animals and the environment?* (p. 11)

Summarize each writers point of view. Write your own response to the questions, using examples to back up your ideas.

Graphic: The Tribune September 1991

Conduct a survery based on the issues raised in the article. Graph or chart you results based on age, sex or another category.

You have $50,000 to donate to a worthy cause. You must donate the money either to an animal preservation organization or a human rights agency. You may only choose one. Make your decision and describe why you made this decision.

ATMOSPHERE

TO THE TEACHER

The articles reflect a conflict over who is responsible for global warming. After reading the articles, discuss with your students the Northern and Southern perspectives. Does it matter who is responsible? Who cleans up the mess?

This section has been deliberately kept short, as material on atmospheric problems is easily accessable, and there is only a limited space in this scrapbook. You may wish to have your students collect materials on this subject for you, which will help with their research skills and will provide you with further readings on the subject.

STUDENT ACTIVITIES

Articles 1-4. Atmospheric Problems (pp. 13-16)

Make a board game that teaches about global warming and the depletion of the ozone.

Make a poster showing the different causes of global warming and ozone depletion.

"COUGH"

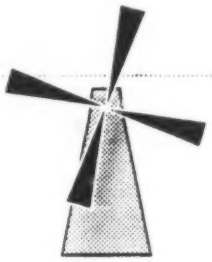
ENERGY

TO THE TEACHER

Divide the students into groups representing different forms of energy. They are to create a campaign advertising their energy form. They can make bumper stickers, brochures, videotapes, etc to sell their form of energy as the best. Since this is also part of the Science curriculum, integration with the Science teacher would access additional time and resources. Host an energy fair, where students set up a booth selling their energy form.

STUDENT ACTIVITIES

Articles 1-2. Alternative Power (pp. 17-20)



If your community were to explore renewable energy resources, which do you think would be the best choice? Why?

Write your own script or 30 second ad promoting a renewable source of energy.

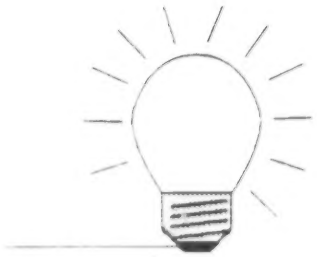
Make a list of all the things your family uses electricity for. In what areas could you cut down? What does your family do already to conserve energy? Survey other families to find out how they use electricity.

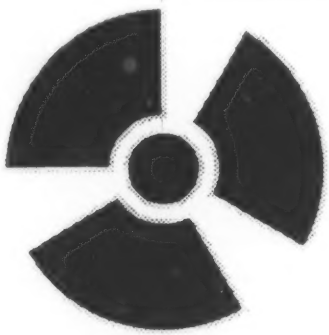
Make a brochure on energy conservation.

3-6 Nuclear energy (pp. 21-24)

Read the articles about nuclear energy. What claims do each side make about the safety / danger of nuclear power?

Analyze the quote "Nuclear waste is like getting on a plane, and in mid-air you ask the pilot, how are we going to land? He says, we don't know—but we'll figure it out by the time we get there". Is this true? Are there other issues to which this applies?





WATER POLLUTION

TO THE TEACHER

Water is one of the basic necessities for life. Encourage students to examine their own water usage. Are there any local water management problems which they could investigate? What system is used to manage local reservoirs? What steps must be taken to ensure that clean water is available in the future?

At the same time it is important to examine water issues that are not caused by human consumption, but which are by-products of development, such as oil spills, or the negative impacts of logging on salmon spawning streams. If humans aren't directly impacted, does it matter? If so, what can be done to prevent water pollution in these cases?

STUDENT ACTIVITIES

1-3 Water Pollution and Consumption (pp. 25-27)

Read these articles as a section

Present the information in "Water: Resources and Consumption" in a visual way. Put the percentages of water in the hydrosphere in a pie graph, for example. Find some information on the amount of water Canada possesses.

Explain how contamination of water supplies affects every living thing on the planet. Write or draw your explanation.

Find out about water use in your community. Is there ever a need for rationing? How much is used each day? How is it treated? Where is most water used?

Consciously try to reduce the water you use in a day. Keep track of everything you use water for. How were you able to cut down? Did it make a difference to your day? Analyze your thoughts in a journal.

WASTE DISPOSAL

TO THE TEACHER

Waste disposal is a global problem. Have students explore their community's waste disposal plan. What is recycled? What is done with toxic waste? Where are the landfills? What is planned for the future? This activity would get students interacting with community leaders and allow them to see the problem "in their own backyard". They could also project into the future: when they are wage-earners, what will the situation be if no changes are made? if changes are made?

STUDENT ACTIVITIES

1-4 Waste Problems (pp. 28-29)

Read these articles as a section

Role play the leader of a South Pacific country trying to decide whether to accept waste from another country in return for money and aid.

Africa has taken a big step in banning toxic waste dumping, while Southeast Asia has become the new toxic waste dumpsite for the industrialized countries. Write your opinion on these two decisions.

Write a script for a Board of Directors meeting of a large company that needs to dispose of toxic waste in an increasingly hostile environment. What are the options?

Get a garbage bag and carry around all the garbage you create in a week. Did you make different choices about packaging and reusing knowing you would have to carry everything around? Did the amount of garbage you created surprise you? Keep a journal for the week to analyze your thoughts and feelings about this activity.

Discuss or Debate: Poor countries should be encouraged to accept "dirty" industries.

MEGA-DEVELOPMENT

TO THE TEACHER

These three articles all focus on dam projects. Have students research other types of megadevelopment projects.

STUDENT ACTIVITIES (pp. 30-34)

Conduct a survey on peoples' opinions about megaprojects in First and Third World countries. Do people react differently depending on where the project is located? Who are the people being displaced by megaprojects and why don't they have a voice?

FORESTS

TO THE TEACHER

Since logging and the environmental movement are "hot" local issues, guest speakers representing the different points of view around this issue would provide students with an opportunity to ask questions and draw their own conclusions from the information given. Follow up activities such as role plays and debates would work well after listening to guests.

STUDENT ACTIVITIES

Articles 1-6. Forestry Issues (pp. 36-45)

Read these articles as a section

Role play the interaction between an environmentalist blockading a logging road and a man who depends on logging for his income. How would the roleplay be different for Third World environmentalists compared to environmentalists from Canada?

What is the effect of "People Power" in forestry issues? Can one person make a difference?

Research the indigenous peoples of BC and how they are becoming involved in the forest industry.

BIODIVERSITY

TO THE TEACHER

"It costs roughly $25,000 for the US National Zoo to breed each Golden Lion Tamarin (monkey), return it to Brazil and prepare it for the wild". As an introduction to this section, analyze with your students the implications of spending this amount of money preserving one animal.

STUDENT ACTIVITIES

Article 1. *The Economics of Biodiversity* (p. 46)

Debate: "In order to preserve a species, it must have an economic value".

Article 2. *Vanishing Species and New Zoos* (p. 48)

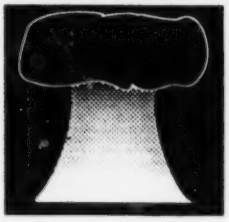
Write an essay that agrees or disagrees with this statement: "It is necessary to have zoos in order to preserve animal species".

Carry out the two activities at the end of the article.

WAR AND THE ENVIRONMENT

TO THE TEACHER

We are in a time when the face of the enemy is continually changing. Discuss with your class the "real" enemy we as inhabitants of the planet are facing.



As a class, contribute to a bulletin board or chart entitled "Signs of Hope" using current events, newspaper clippings, etc.

Write an essay entitled "Nuclear Overkill". Explain and describe the reasons leading to this present level.

STUDENT ACTIVITIES

Articles 1-5. War and the Environment (pp. 49-55)

Read these articles as a section

Discuss this statement: "It is not technology itself that is good or bad, but the use to which it is put". Consider this in terms of militarism and health.

Using the "Green Berets" article, brainstorm a list of non-military uses for military budgets. In groups, priorize your lists and present to the class.

Write a letter to your MP suggesting ways Canada could redirect its military spending. (See p. 74)

UNCED

(United Nations Conference on Environment and Development)

TO THE TEACHER

Since the Earth Summit has ended, it would be interesting to keep track of real changes that have occurred because of the agreements reached. Have students explore this issue, using media sources and development organizations for their information.

STUDENT ACTIVITIES

Articles 1-5. The Earth Summit (pp. 56-59)

Some people feel the Earth Summit was a great success; others feel it was a failure. What do you think? Is it possible for world leaders to work together for change? Where does the push for change need to come?

"Politicians are concerned with short-term popularity, not long-term solutions." Discuss.

Article 2. *Tread Gently on the Earth* (p. 57)

These four essays provide a southern perspective on global issues. Do you feel they have a legitimate argument? Choose one article and write a letter to the author, explaining how you as a "northerner" feel about their comments.

SOLUTIONS

TO THE TEACHER

The solution section to the booklet can be the most proactive for students. Often we become mired in the overwhelming problems facing the earth, and young people are typically disenfranchised from real decision-making power. Increasing their awareness of issues and exercising their consumer buying power can help them feel more empowered. Host a "What We Can Do" Day in your class, where students present their research to their peers or younger students. Booths on what we can learn from developing countries, buying green, making personal changes, writing effective letters, etc. would all make excellent displays and hands-on demonstrations.

STUDENT ACTIVITIES

Article 1-2. Women's solutions (pp. 60-62)

We in the West often think we have the answers for developing countries; yet these articles mention things that we can learn from them. Make a poster depicting some of these ideas.

Research a Canadian woman who has worked for social change. Write about her accomplishments.

Article 3. *50 Difficult Things* (p. 64)

Divide these into two columns relating to your life: Realistic and Unrealistic. Include any explanation necessary.

Articles 4. *Simply Nine Ways* (p. 65)

Find out more information on one of these suggestions. Develop your ideas into a poster for display in the class.

Choose one suggestion to "adopt". Keep a journal explaining how you carried out your resolution, whether is was easy or difficult, etc.

"Thanks for your help!"

WRITING EFFECTIVE LETTERS

It is said that for every letter received by an M.P. or M.L.A. there are another 100 constituents who share a concern on the same issue. Elected officials do pay attention to letters and they do have an impact. For example, letter writing campaigns in the Prairie Provinces in the 1970s formed part of a successful strategy for increased development aid from the provincial governments.

Graphic: The Africa File

Letter writing is a very concrete action item for a group. You can plan a joint letter writing session at the end of a development education program. You can hold a "letter writing day", in which you invite all your members, friends, neighbors and their children to a meeting hall to write letters. Set up different writing stations with lots of paper, pens, envelopes, and sample letters. Set up stations for children as well ... they can add their drawings and letters too! Make it a fun event by providing background music and coffee and refreshments. Think of creative letter ideas: write them on papier mache characters (hogs? doves? mice?), inside a large outline of a character or picture such as a cutout of people working together, or make a collage of letters. The releasing of a large number of colored balloons with letters attached (you can photocopy one letter, addressed "To Canada") can provide a very symbolic gesture at the closing of a letter-writing day.

Build a letter-writing campaign by asking different groups of people to write letters (such as your church group, or NGO members, or social group). Time the campaign so that large amounts of mail would arrive at the official's desk on certain days. Change the text of the letter for the subsequent letters.

Here are some tips for effective letters to public officials:

1. Limit each letter to a single issue, keep it brief and to the point.
2. Make your letter personal. Tell of any personal involvement you have in the issue and state why you are personally advocating a particular position. Point up any moral factors involved in the issue.
3. Identify any organization to which you belong which has taken an official stand or some action on the issue. Reiterate the stand or quote the official statement or resolution.
4. Let the receiver of the letter know that you are concerned and informed. Be positive.
5. Point out concerns you have around the issue or criticisms of the stand or actions the legislator or the party or the government has taken.
6. End the letter with a question that needs a reply; requesting information from the legislator or requesting his opinion, stand, or past action on the issue.
7. Respond to the reply with another question and more concerns or criticisms.

Forms of Address for Canadian Government Officials:

The Governor General
Her/His Excellency _____
Government House
Ottawa

The Prime Minister of Canada
The Right Honourable _____
House of Commons
Ottawa, K1A 0A6

Member of the Cabinet
The Honourable _____
House of Commons
Ottawa, K1A 0A6

Member of Parliament
_____, M.P.
House of Commons
Ottawa, K1A 0A6

Member of the Senate
The Honourable _____
The Senate
Ottawa

The Lieutenant-Governor of (a Province)
His/Her Honour _____
Government House
Capital City, Province

Premier of a Province
The Honourable _____, M.L.A.
Legislative Assembly
Capital City, Province

Member of a provincial government
_____, M.L.A.
Legislative Assembly
Capital City, Province

Reprinted from *Basics and Tools. Basics and Tools: A Collection of Popular Education Resources and Activities* was published by CUSO in Ottawa in 1988.

The Environment Scrapbook

This newly updated reading kit presents a scrapbook of selected articles from over 25 journals and periodicals from around the world. The material is current, concise and balanced in viewpoint. The scrapbook also contains a new section of teaching activities and ideas. All materials in the scrapbook are copyright approved for photocopying for classroom use.

The **Environment Scrapbook** covers such topics as: the atmosphere; energy; water pollution and waste disposal; megadevelopment; forests; biodiversity; war and the environment; UNCED; and more!

Global Issues Reading Kits

This scrapbook is one in a series of reading kits. The complete series is:

Kit #1 - The Environment
Kit #2 - The Food Scrapbook
Kit #3 - The Urbanization Scrapbook
Kit #4 - The Economics Scrapbook
Kit #5 - The Population Scrapbook

VIDEA

(Victoria International Development Education Association)

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